Cytomics FC 500 MPL
With MXP Software

Reference



PN 177579BD (October 2011)

Beckman Coulter, Inc.
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Brea, CA 92821

BECKMAN COULTER

WARNINGS AND PRECAUTIONS

READ ALL PRODUCT MANUALS AND CONSULT WITH BECKMAN COULTER-TRAINED PERSONNEL BEFORE ATTEMPTING TO OPERATE INSTRUMENT. DO NOT ATTEMPT TO PERFORM ANY PROCEDURE BEFORE CAREFULLY READING ALL INSTRUCTIONS. ALWAYS FOLLOW PRODUCT LABELING AND MANUFACTURER'S RECOMMENDATIONS. IF IN DOUBT AS TO HOW TO PROCEED IN ANY SITUATION, CONTACT YOUR BECKMAN COULTER REPRESENTATIVE.

HAZARDS AND OPERATIONAL PRECAUTIONS AND LIMITATIONS

WARNINGS, CAUTIONS, and IMPORTANTS alert you as follows:

WARNING - Can cause injury.
CAUTION - Can cause damage to the instrument.
IMPORTANT - Can cause misleading results.

BECKMAN COULTER, INC. URGES ITS CUSTOMERS TO COMPLY WITH ALL NATIONAL HEALTH AND SAFETY STANDARDS SUCH AS THE USE OF BARRIER PROTECTION. THIS MAY INCLUDE, BUT IT IS NOT LIMITED TO, PROTECTIVE EYEWEAR, GLOVES, AND SUITABLE LABORATORY ATTIRE WHEN OPERATING OR MAINTAINING THIS OR ANY OTHER AUTOMATED LABORATORY ANALYZER.

WARNING Risk of operator injury if:

- All doors, covers and panels are not closed and secured in place prior to and during instrument operation.
- The integrity of safety interlocks and sensors is compromised.
- Instrument alarms and error messages are not acknowledged and acted upon.
- You contact moving parts.
- You mishandle broken parts.
- Doors, covers and panels are not opened, closed, removed and/or replaced with care.
- Improper tools are used for troubleshooting.

To avoid injury:

- Keep doors, covers and panels closed and secured in place while the instrument is in use.
- Take full advantage of the safety features of the instrument. Do not defeat safety interlocks and sensors.
- Acknowledge and act upon instrument alarms and error messages.
- Keep away from moving parts.
- Report any broken parts to your Beckman Coulter Representative.
- Open/remove and close/replace doors, covers and panels with care.
- Use the proper tools when troubleshooting.

CAUTION System integrity might be compromised and operational failures might occur if:

- This equipment is used in a manner other than specified. Operate the instrument as instructed in the Product Manuals.
- You introduce software that is not authorized by Beckman Coulter into your computer. Only operate your system's computer with software authorized by Beckman Coulter.
- You install software that is not an original copyrighted version. Only use software that is an original copyrighted version to prevent virus contamination.

IMPORTANT If you purchased this product from anyone other than Beckman Coulter or an authorized Beckman Coulter distributor, and, if it is not presently under a Beckman Coulter service maintenance agreement, Beckman Coulter cannot guarantee that the product is fitted with the most current mandatory engineering revisions or that you will receive the most current information bulletins concerning the product. If you purchased this product from a third party and would like further information concerning this topic, call your Beckman Coulter Representative.

REVISION STATUS

Issue A, Initial Issue, 8/03
MXP Software Version 1.0. Initial issue for customer distribution.

Issue B, 11/04
MXP Software Version 2.0. Complete Revision. Updated and new information was added for variable sample aspiration and mixing cycles in the Plate Wizard. The Auto Startup function was deleted. The optional 21 CFR Part 11 feature was added.

Issue BA, 05/08
MXP Software Version 2.2. Updated or new information was added on pages 2-2, 2-3, 3-2, 3-4, C-2 and C-3.

Issue BB, 03/09
MXP Software Version 2.2.

Updates were made to pages 3-3, B-167, B-167, B-167, and C-2.

Issue BC, 05/10
Software Version 2.2.

Updates were made to the company corporate address.

Issue BD, 10/11
MXP Software Version 2.2 (Analysis or Cytometer)

Additions, changes, or deletions were made at these locations:

xxi, 3-3, B-1, B-37, B-53, B-150, B-152, B-166, C-3, and GLOSSARY-3.

Note: Changes that are part of the most recent revision are indicated in text by a bar in the margin of the amended page.

This document applies to the latest software listed and higher versions. When a subsequent software version changes the information in this document, a new issue will be released to the Beckman Coulter website. For labeling updates, go to www.beckmancoulter.com and download the most recent manual or system help for your instrument.

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CONTENTS

This introductory section contains the following topics:

- USING YOUR Cytomics FC 500 MPL MANUALS
- ABOUT THIS MANUAL
- CONVENTIONS, and
- GRAPHICS.

USING YOUR Cytomics FC 500 MPL MANUALS

The manuals listed below are available as PDF files in the FC 500 MPL MXP software. Printed versions of these manuals are also available by order.

Use the **Reference** manual for instrument specifications and information on installation and system options.

Use the **Instructions For Use** manual for the day-to-day running of your instrument. Go through the detailed step-by-step procedures of startup, quality control (QC), running samples, analyzing data, printing reports, reviewing QC data, and shutdown. It contains safety and troubleshooting information, error messages, as well as in-depth information on the principles of flow cytometry, information about what your instrument does, and the methods it uses.

Use the **Special Procedures** manual to clean, replace, or adjust a component of the instrument.

Use the **System Administrator's Guide** to add and edit user profiles including their User IDs and privileges. If you have the 21 CFR Part 11 optional software, as part of your laboratory's responsibility for compliance: 1) only the System Administrator should have access to and use the System Administrator's Guide, 2) the CD-ROM containing the System Administrator's Guide should be protected from access by non-administrator personnel.

ABOUT THIS MANUAL

Your Cytomics FC 500 MPL Reference manual provides instrument specifications and information on installation, safety and software features.

This information is organized as follows:

- Chapter 1, USE AND FUNCTION
  Contains a short description of the major instrument components and options, and the reagents and quality control materials used.
- Chapter 2, INSTALLATION
  Contains instrument requirements, and diagrams of the interunit cable connections.
- Chapter 3, SPECIFICATIONS
  Details the instrument and performance specifications.
- Appendices
  The appendices provide reference material on the following topics:
  - LOG SHEETS
  - USING MXP SOFTWARE
  - 21 CFR PART 11 OPTION COMPLIANCE INFORMATION

- GLOSSARY
  The glossary has definitions for many of the words and terms used in flow cytometry.
- INDEX
  Use the Index to easily locate specific information in this manual.

CONVENTIONS

This manual uses the following conventions:

- Throughout this manual your FC 500 MPL is also referred to as the system or instrument.
- **Bold font** indicates a software option, such as **Cytometer**.
- *Italics font* indicates screen text displayed on the instrument, such as *Preparing Samples*.
- `Courier font` indicates text you have to type using the keyboard.
- ▢ indicates a key (such as Enter).
- ▢+▢ indicates that the two keys listed (such as Alt+F2) are linked for a specific function and must be pressed in this sequence:
  a. Press down on the first key listed and while continuing to press it, press down on the second key listed.
  b. Release both keys at the same time.
- ▢ ▢ indicates to press and release the first key listed then press and release the next key listed. For example: Y Enter.
- Icons/buttons to select functions on the software screen are shown within text.
  Example:  .
-  indicates to use the mouse to select the screen button labeled  .
-  **File ▸▸ Save** indicates to use the mouse to select the **Save** item on the **File** menu.
- F1 through F12 are special function keys.
- A **Note** contains information that is important to remember or helpful in performing a procedure.
- The terms “screen” and “window” are used interchangeably.
- ***SHOW ME*** means there is a video available for the procedure in the online help.

To Choose A Command With The Keyboard

After you press Alt, each menu name has one letter underlined to indicate which letter to use to pull down the menu. For example, the letter F in the File menu is underlined, press F to pull down the File menu; the letter E in the Edit menu is underlined, press E to pull down the Edit menu.

Command	Function
Enter	Accepts your selection.
Esc	Stops the operation, discarding your choices.
Tab	Moves cursor over different choices if there are multiple options - see Windows® manuals for Windows operation via keyboard.
Alt+Tab	When you have more than one application Window open, use Alt+Tab to switch between tasks.

Dialog Box

Dialog boxes receive commands or information; for example, a file name dialog box receives information about a file name.

OK	Accepts the information you have selected or typed.
Cancel	Stops the operation, ignoring your choices.

Description of Reporting Units

Unless otherwise stated, all parameter units are shown in the US unit format (cells/µL) throughout the manuals.

GRAPHICS

All graphics, including screens and printouts, are for illustration purposes only and must not be used for any other purpose.

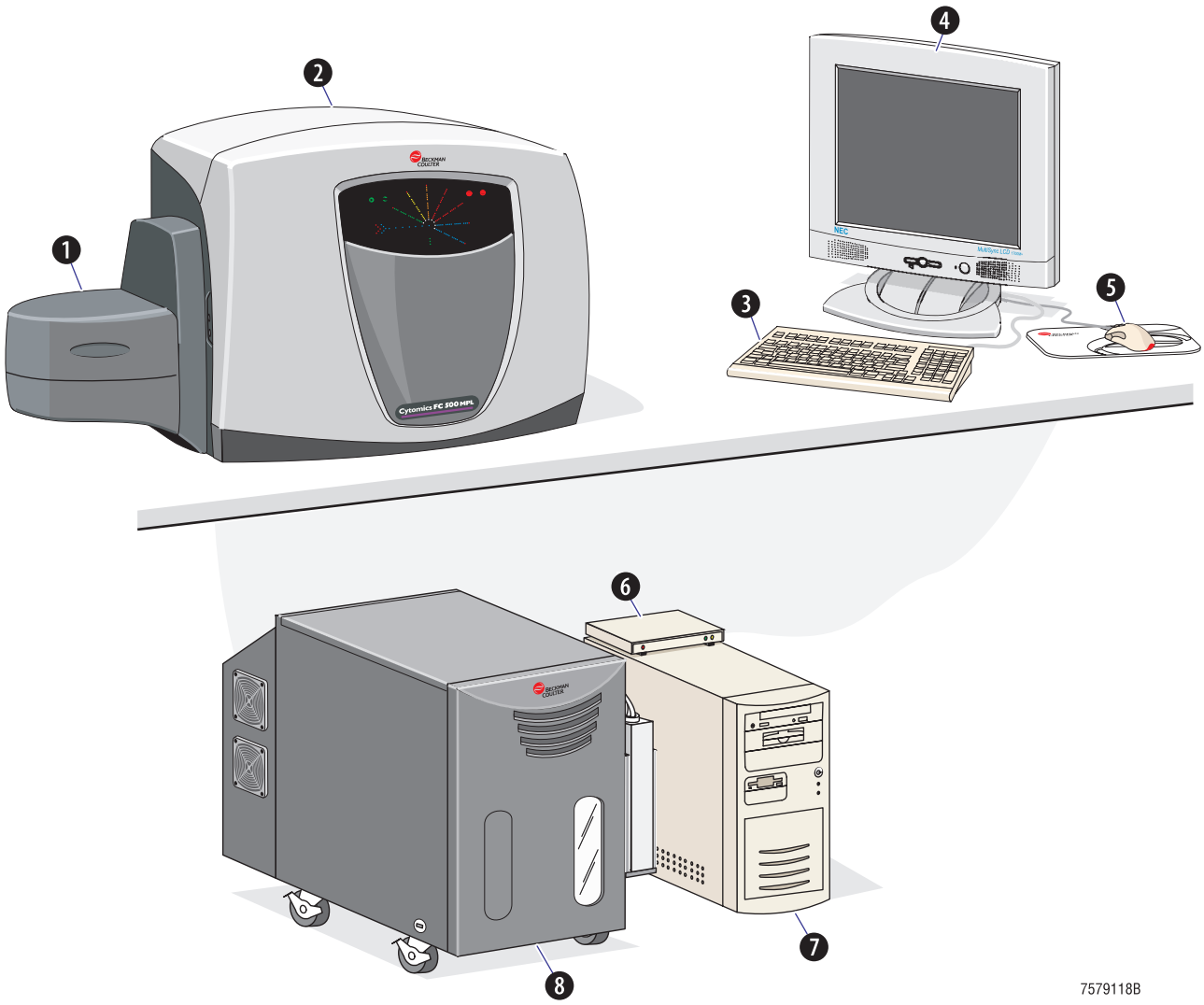
COMPUTER PROGRAM STATEMENT

WARNING This computer program is protected by international copyright laws, and unauthorized copying, use, distribution, transfer, or sale is a violation of those laws that may result in civil or criminal penalties. This computer program may also be subject to additional restrictions contained in a license granted by Beckman Coulter, Inc. to the authorized user of this computer program or to the authorized owner or other authorized user of the system onto which this computer program is installed. Any violation of the license provisions may result in additional civil penalties, including an injunction and damages. Please refer to the computer program or system agreement or to the computer program or system documentation for the terms and conditions of that license.

1.1 SYSTEM COMPONENTS

The system components are shown in Figure 1.1.

Figure 1.1 Cytomics FC 500 MPL Flow Cytometry System



❶	MPL	❺	Mouse
❷	Cytometer	❻	USB box
❸	Keyboard	❼	Computer
❹	Monitor	❽	Power Supply

Cytometer

This unit analyzes the sample. It contains the internal sheath fluid and cleaning agent containers.

Power Supply

This unit provides DC power, pressure, and vacuum to the Cytometer.

A separate 20-L waste container is also provided.

Workstation

The Workstation runs the software that enables you to control the instrument. It displays sample results and other information. It consists of:

- A monitor
- A computer with data storage devices
- A USB box
- A keyboard and a mouse.

Multi-Plate Loader (MPL)

The MPL is an automated sample loader for the instrument. It accepts these sample plate types:

- 96 well plate, normal or deep (round or square wells)
- 24 well plate, or
- 40 tube holder (supplied by Beckman Coulter). This holds 12- x 75-mm plastic test tubes.

MXP Cytometer Software

This contains the MXP Acquisition and Analysis software and is used when running the Cytometer. This application is loaded into a directory labeled C:\MXP.

The MXP software also contains the Beckman Coulter Accounts and Permissions (BCA&P) database which uses Microsoft® SQL Server™ 2000. These items are installed as part of the MXP software, version 2.0, installation procedure.

Microsoft® Excel Software

Excel software is provided for exporting data. Only Microsoft Excel, versions 2002 and version 2003, have been tested to be compatible with the MXP software. No other version of Excel software should be used.

1.2 OPTIONS

Hardware Options

Printer

Provides a printout of sample results and other information. The Printers available for the system are subject to change, so contact your Beckman Coulter Representative for the current model selection.

Workstation/Network Server

A Beckman Coulter FlowCentre Multimedia Workstation can be used as an offline analysis workstation and network server for data and worklist transfer.

Second Laser

A 635-638 nm red solid-state laser providing a minimum of 25 mW light regulated laser power. The second laser has a shutter that allows you to block the laser output.

Filter Kit

The optional filter kit includes 5 extra filter holders, an ND 1.0 filter, a full mirror (in a holder), a 50% mirror in a holder and an additional filter block base.

Single Laser Filter Block

An assembled filter block configured as shown in Figure 5.7 in the Instructions For Use manual.

Dual Laser Filter Block

An assembled filter block configured as shown in Figure 5.6 in the Instructions For Use manual.

Single Laser Filter Kit

The single laser filter kit includes two filters: a 620 BP filter and a 645 DSP filter.

Dual Laser Filter Kit

The dual laser filter kit includes two filters: a 620 SP filter and a 615 DSP filter.

Software Options

21 CFR Part 11 Option

By providing audit trails and electronic signatures for files, this option provides the tools for your data files produced by the MXP software to be in compliance with the requirements of the FDA's Electronic Records and Electronic Signatures Rule (21 CFR Part 11).

DaCS™ software is supplied with the 21 CFR Part 11 option. DaCS software provides the controls to help you bring your laboratory into 21 CFR Part 11 compliance for data files exported to Microsoft Excel from the MXP software.

1.3 REAGENTS AND QUALITY CONTROL MATERIALS

Beckman Coulter recommends these reagents or their equivalents. All stated performance characteristics in this manual are based on the use of the Cytomics FC 500 MPL system with the following reagents.

Sheath Fluid

In the Cytometer, the sample is guided into a stream of sheath fluid to make the sample cells flow single file through the laser beam. IsoFlow sheath fluid, a nonfluorescent, balanced electrolyte solution, is made for this purpose.

IsoFlow sheath fluid has the following characteristics:

- Filtered to 0.2 µm
- Transparent and nonfluorescent to 488 nm laser light
- Low background
- Compatible with the characteristics of the sample being measured (such as pH, osmolality, conductivity).

A 10 L container of sheath fluid is connected to the instrument and sheath fluid is pumped into the internal sheath fluid container as needed. The internal sheath container has a working capacity of about 2 L. The amount of sheath fluid the container holds beyond the working capacity is for pressurization and level sensing.

Cleaning Agent

When the Cytometer is in the Cleanse mode, COULTER CLENZ cleaning agent flushes sample tubing and helps to reduce protein buildup and particles in the instrument. Each cleanse cycle uses about 15 mL of cleaning agent.

The cleaning agent container has a working capacity of about 500 mL. That is enough cleaning agent to use the Cleanse mode once a day for 1 month. The amount of cleaning agent the container holds beyond the working capacity is for pressurization and level sensing.

Read the container's label for more information on the cleaning agent.

Quality Control Materials

The quality control materials available from Beckman Coulter are:

Flow-Check Fluorospheres	Fluorospheres used to check the stability of the optical and fluidic systems.
Flow-Set Fluorospheres	Fluorospheres used to standardize light scatter and fluorescence intensity for cell surface marker applications.
Cyto-Trol Control Cells	Lyophilized lymphocytes with assay values for specific surface antigens. Used to assess monoclonal antibody function and verify proper flow cytometer setup.
Immuno-Trol Cells	Stabilized erythrocytes and leukocytes with a known quantity of surface antigens. Used to verify monoclonal antibody performance as well as verify the process of sample staining, lysing, and analysis.
Immuno-Trol Low Cells	Stabilized erythrocytes and leukocytes with a known quantity of surface antigens. Used to verify monoclonal antibody performance as well as verify the process of sample staining, lysing, and analysis.
Immuno-Brite Fluorospheres	Uniform size fluorospheres with varying fluorescence intensities that are used to monitor instrument linearity.
Cyto-Comp Cell Kit	Cyto-Comp Cells stained with a single color, such as CD45, are used to adjust color compensation settings for multicolor analysis using monoclonal antibodies.
QuickCOMP 2 Kit	Two single-color antibody reagents (FITC and PE) that can be used to adjust color compensation on a flow cytometer.
QuickCOMP 4 Kit	Four single-color antibody reagents (FITC, PE, ECD, and PC5) that can be used to adjust color compensation on a flow cytometer.

Additional quality control reagents are available, contact your local Beckman Coulter Representative or access http://www.beckmancoulter.com.

1.4 MATERIAL SAFETY DATA SHEETS (MSDS)

To obtain an MSDS for Beckman Coulter reagents used on the Cytomics FC 500 MPL flow cytometer:

1. On the internet, go to http://www.beckmancoulter.com:
   a. Select MSDS from the Customer Support drop-down menu.
   b. Follow the instructions on the screen.
   c. Contact your Beckman Coulter Representative if you have difficulty locating the information.
2. If you do not have Internet access:
   - In the USA, either call Beckman Coulter Customer Operations (800-526-7694) or write to:

     Beckman Coulter, Inc.
     Attention: MSDS Requests
     P.O. BOX 169015
     Miami, FL 33116-9015
   - Outside the USA, contact your Beckman Coulter Representative.

2.1 DELIVERY INSPECTION

The instrument (or MPL upgrade kit) is tested before shipping. International symbols and special handling instructions are printed on the shipping cartons to inform the carrier of the precautions and care applicable to electronic instruments.

CAUTION Possible instrument damage could occur if you uncrate the instrument, install it, or set it up. Keep the instrument in its packaging until your Beckman Coulter Representative uncrates it for installation and setup.

When you receive your instrument, carefully inspect all cartons. If you see signs of mishandling or damage, file a claim with the carrier immediately. If separately insured, file the claim with the insurance company.

2.2 SPECIAL REQUIREMENTS

Before your Beckman Coulter Representative arrives to install the instrument, you must determine where you want the system placed and the overall layout. Consider the factors described in the following paragraphs.

Space and Accessibility

Allow room to interconnect the system components. Also, arrange for:

- Comfortable working height
- Space for ventilation, and access for maintenance and service:

Specifications	FC 500 MPL with HeNe Laser	FC 500 MPL w/o Second Laser or with Red Solid-State Laser
Height		
Instrument	61.0 cm (24 in.)	61.0 cm (24 in.)
Additional clearance above for servicing and lifting the Data Acquisition card cage above the sensor	45.7 cm (18 in.) min.	45.7 cm (18 in.) min.
Total clearance needed	106.7 cm (42 in.)	106.7 cm (42 in.)
Width		
Instrument	119.4 cm (47 in.)	97.8 cm (38.5 in.)
Additional clearance on right for servicing	30.5 cm (12 in.)	30.5 cm (12 in.)
Additional clearance on left for servicing	30.5 cm (12 in.)	30.5 cm (12 in.)
Total clearance needed	180.3 cm (71 in.)	180.3 cm (71 in.)
Depth		
Instrument	88.9 cm (35 in.)	88.9 cm (35 in.)
Additional clearance behind instrument for sufficient cooling and room for servicing	30.5 cm (12 in.)	30.5 cm (12 in.)
Total clearance needed	119.4 cm (47 in.)	119.4 cm (47 in.)

Electrical Input

CAUTION Possible instrument damage could occur if you put the Power Supply plugs on the same electrical circuit or use an extension cord or a power strip to connect the Power Supply. Use two dedicated outlets with isolated grounds for the Power Supply plugs.

Country	Dedicated Lines with Isolated Grounds	Non-Dedicated Lines
USA*	One dedicated line at 115 Vac, 50/60 Hz at 20 A	One non-dedicated line at 115 Vac, 50/60 Hz at 20 A
Europe and other applicable countries	Two dedicated lines at 220 Vac, 50/60 Hz at 20 A **or** Two dedicated lines at 240 Vac, 50/60 Hz at 20 A	Three non-dedicated lines at 220 Vac, 50/60 Hz at 20 A
Japan	Two dedicated lines at 100 Vac, 50/60 Hz at 20 A	Three non-dedicated lines at 100 Vac, 50/60 Hz at 20 A

*USA units are shipped with a line conditioner only requiring one line.

The computer requires a separate outlet, but it does not have to be a dedicated line

Ambient Temperature and Humidity

Keep the room temperature between 16°C and 32°C (60°F and 90°F), and do not let it change more than 5°F per hour. Keep the humidity between 30% and 85%, without condensation.

Heat Dissipation

Heat dissipation is 2,300 W (7,850 Btu/hour) for a single laser system. Heat dissipation is 2,330 W (7,955 Btu/hour) for a two-laser system. Provide sufficient air conditioning (refer to Ambient Temperature and Humidity).

Drainage

The waste line from the Cytometer is connected to a 20 L waste container. Dispose of the waste in accordance with your local environmental regulations and acceptable laboratory procedures.

WARNING Risk of biohazardous contamination if you have skin contact with the waste container, its contents, and its associated tubing. The waste container and its associated tubing might contain residual biological material and must be handled with care. Clean up spills immediately. Dispose of the contents of the waste container in accordance with your local regulations and acceptable laboratory procedures.

The waste line supplied with the instrument can be connected to an open drain. If you use an open drain, mechanically secure the waste tube into the drain so the tube cannot accidentally come out of the drain. This prevents spillage.

2.3 SYSTEM CONNECTIONS

Power and Signal Cables

Figure 2.1 or Figure 2.2 shows the interunit connections of the power and signal cables, depending upon your Power Supply configuration. Computer configuration may vary based on current configuration availability.

Note: If the Cytometer is not connected to the Workstation, when the Acquisition software is started, the **Help ▸▸ About** screen displays an incorrect version number for the Cytometer Firmware.

Figure 2.1 Power and Signal Cable Connections, with Voltage-Specific Power Supply

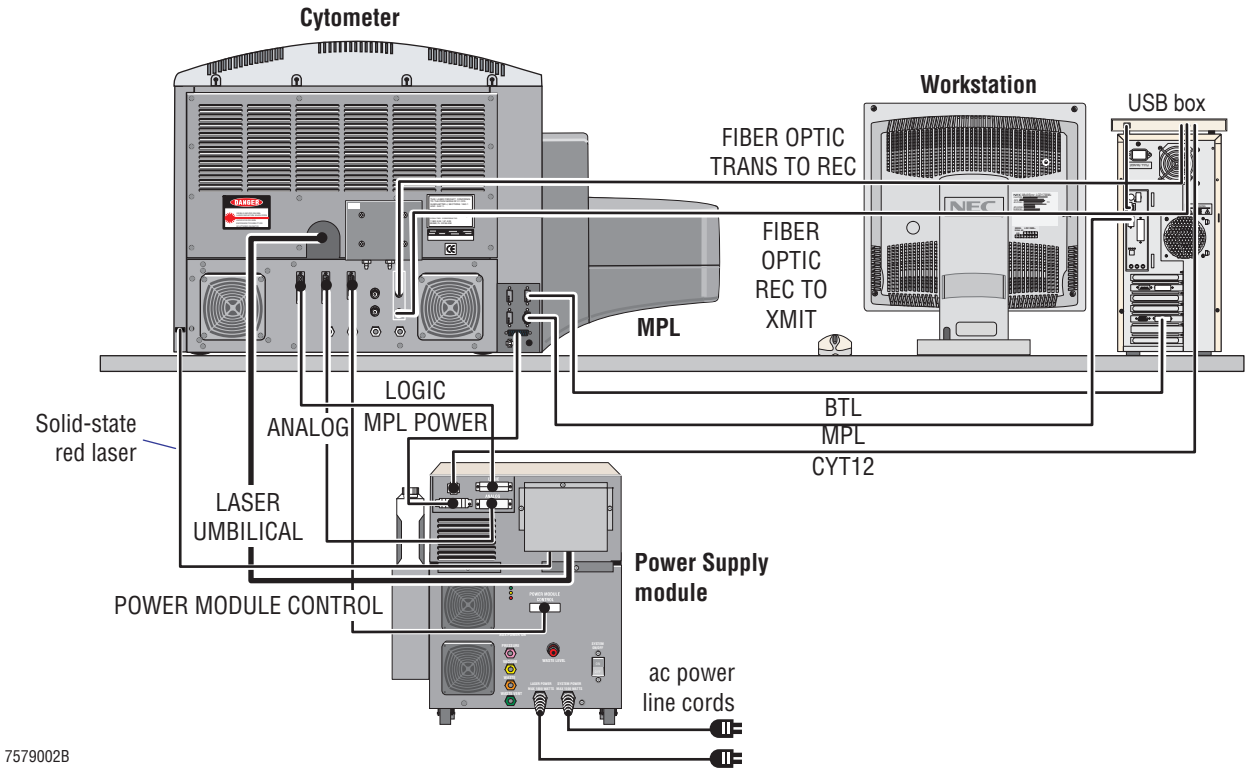
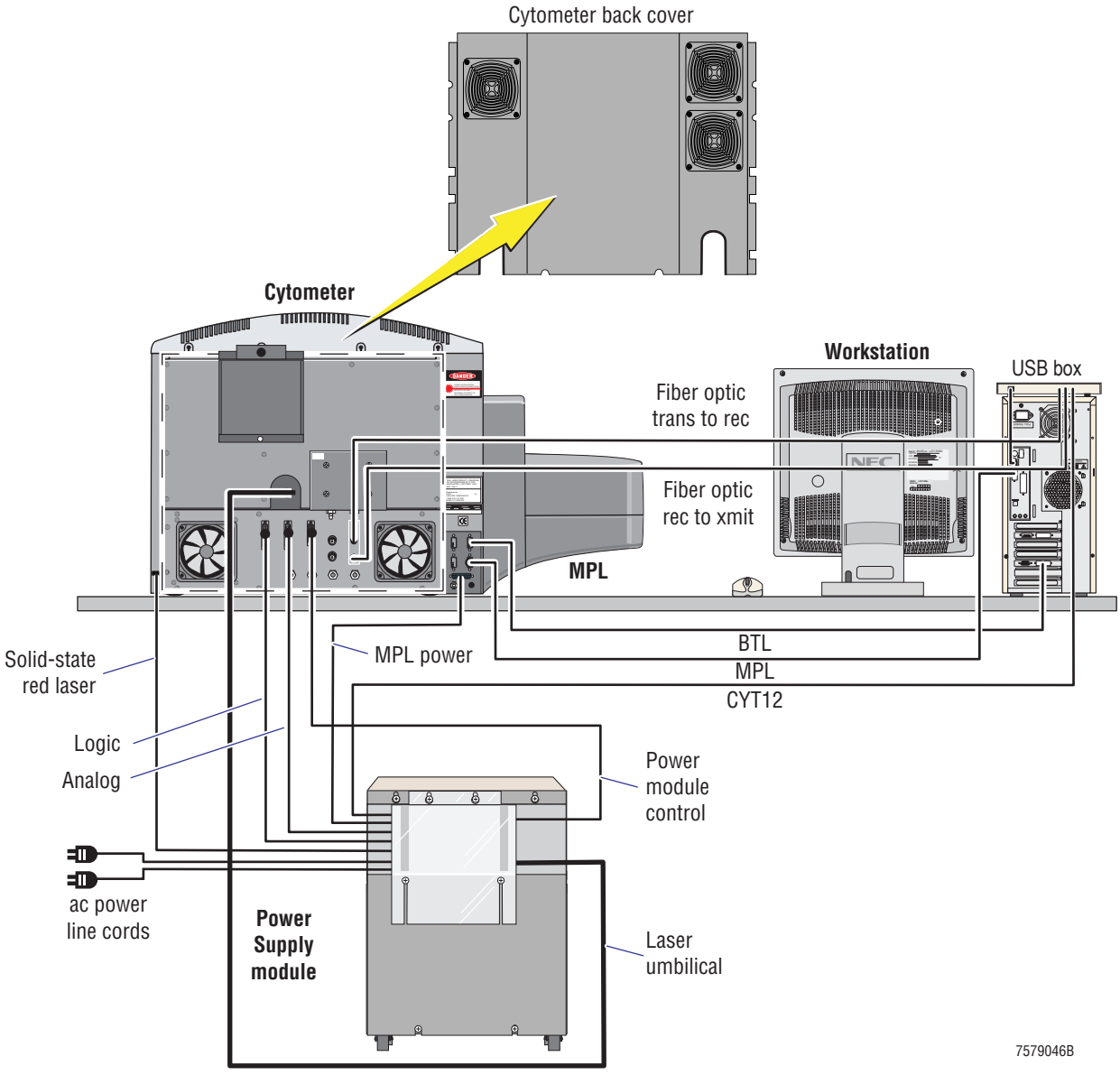


Figure 2.2 Power and Signal Cable Connections, with Universal Power Supply



Waste and Pneumatic Tubing

Figure 2.3 or Figure 2.4 shows the interunit connections for waste and pneumatic tubing, depending upon your Power Supply configuration.

Note: Ensure the waste tubing does not exceed the height of the MPL sample probe.

Note: Place the 10 L external sheath fluid container in a location that is lower than the internal sheath fluid container. This prevents siphoning of the sheath fluid.

Figure 2.3 Waste and Pneumatic Tubing Connections, with Voltage-Specific Power Supply

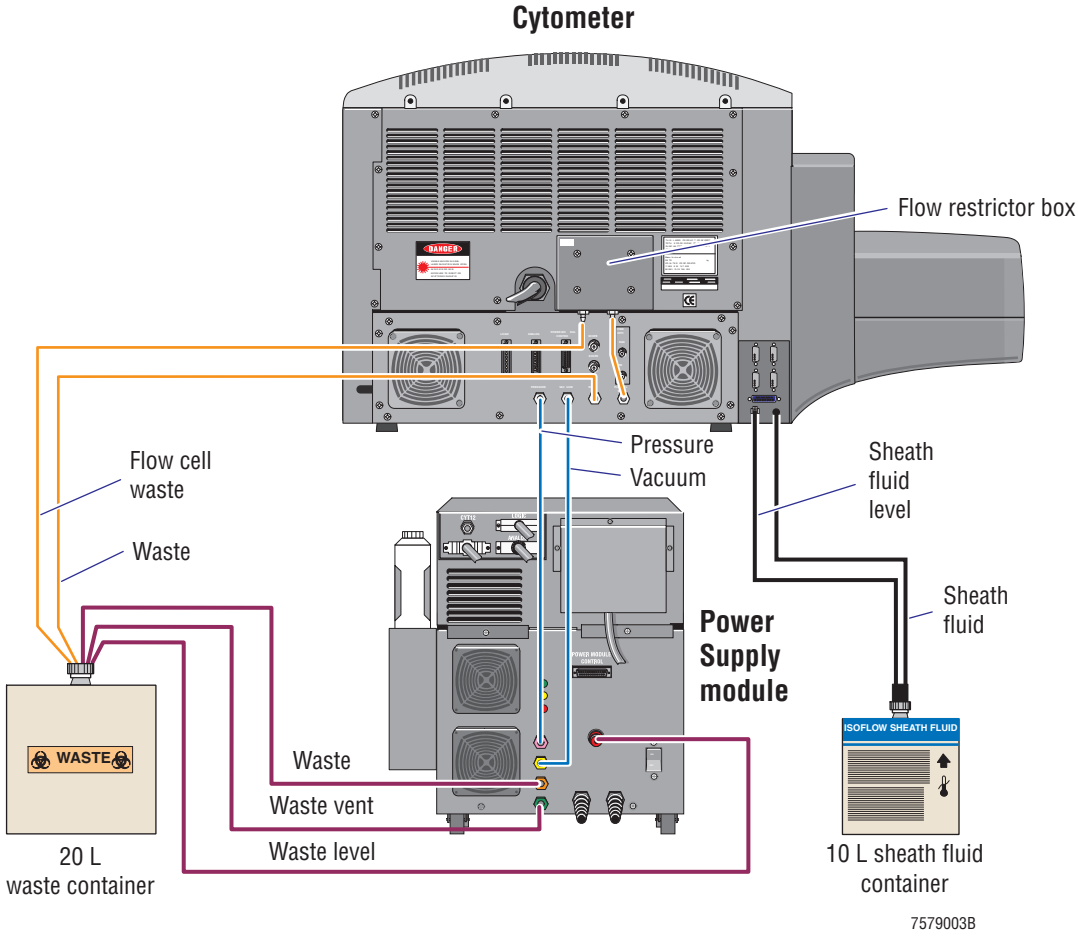
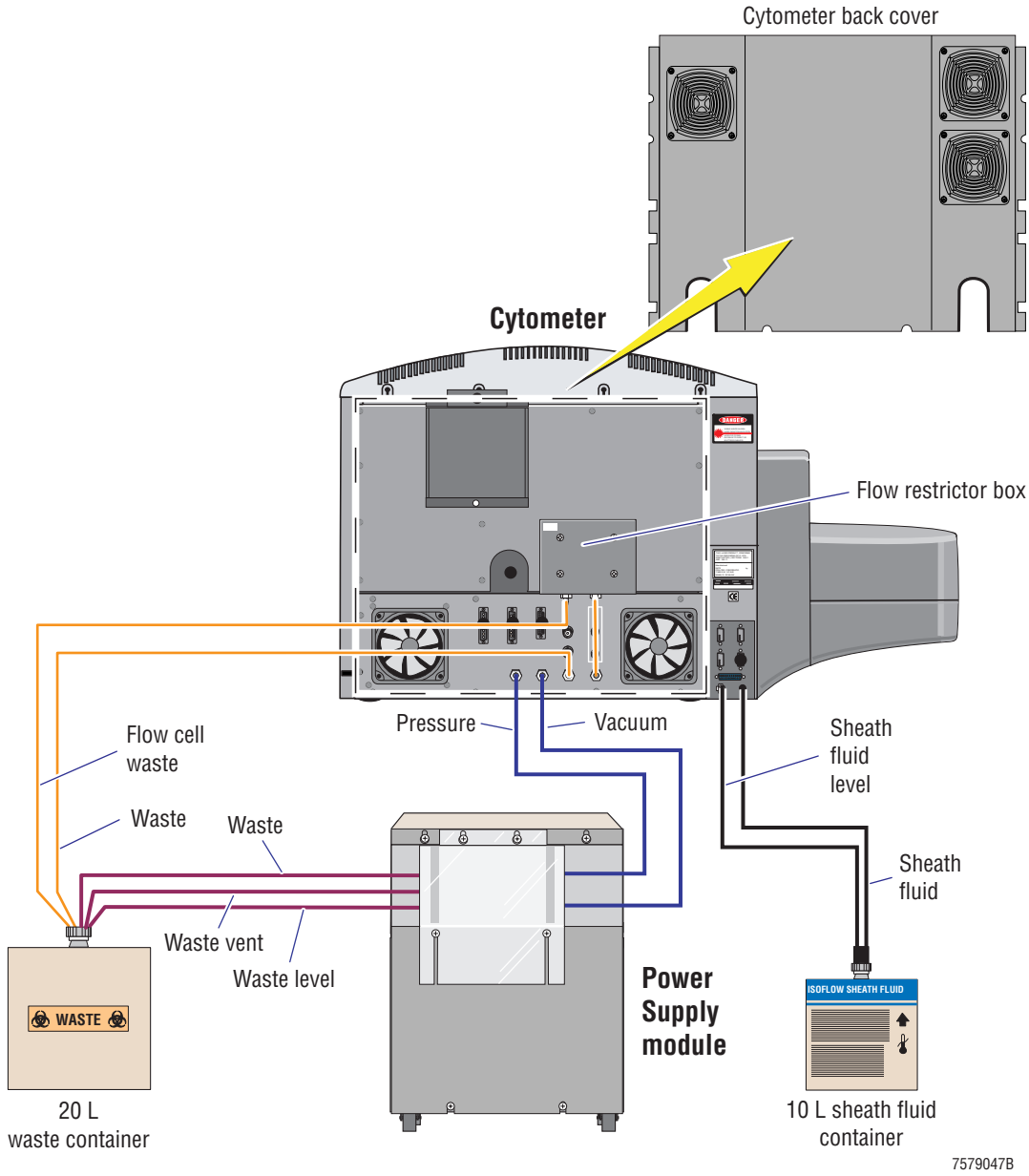


Figure 2.4 Waste and Pneumatic Tubing Connections, with Universal Power Supply



2.4 INSTALLING MXP SOFTWARE

To install the MXP software, see the System Administrator's Guide.

3.1 SAMPLE REQUIREMENTS

See SAMPLE REQUIREMENTS in the RUNNING SAMPLES chapter in the Instructions For Use manual for details.

3.2 INSTRUMENT SPECIFICATIONS

Dimensions

Component	Height	Width	Depth	Weight
Computer	15.75 cm (6.2 in.)	53.34 cm (21 in.)	42.55 cm (16.75 in.)	18.14 kg (40 lb)
Cytometer and MPL (only for units with Universal Power Supply)	61.0 cm (24 in.)	97.8 cm* (38.5 in.)	105.4 cm (41.5 in.)	93.9 kg (207 lb)
Cytometer and MPL	61.0 cm (24 in.)	97.8 cm* (38.5 in.)	88.9 cm (35 in.)	84.8 kg (187 lb)
Monitor (typical)	42.7 cm (16.81 in.)	40.5 cm (15.94 in.)	43.8 cm (17.25 in.)	22 kg (48.4 lb)
Power Supply (Universal)	58.4 cm (23 in.)	45.7 cm (18 in.)	71.1 cm (28 in.)	59.0 kg (130 lb)
Power Supply (Voltage-specific)	50.8 cm (20 in.)	45.7 cm (18 in.)	66.0 cm (26 in.)	54.4 kg (120 lb)

* This is the width with a single argon laser or with the optional red solid-state laser. The width of the FC 500 MPL with the optional HeNe laser is 119.4 cm (47 in.).

Installation Category

Category II (per IEC 1010-1 standard).

Noise

≤65 db

Cytometer

Flow Cell

Sensing area: BioSense 150 µm x 450 rectangular channel with an integral lens, mounted with a vertical (upward) flow path.

Flow Rate

Continuous pressure is applied to the sample pickup tubing. The amount of pressure depends on the flow rate you specify:

- Low - 10 µL/min
- Medium - 30 µL/min
- High - 60 µL/min

Lasers

Air-cooled, software controlled, 20 mW, Argon ion laser operating at 488 nm.

The optional second laser is a solid-state, software controlled, 25 mW, diode laser operating nominally at 635 nm. The second laser has a shutter that allows you to block the laser output to the flow cell.

Argon Laser Power

Laser power is monitored 5 times per second within the system software and the reading is displayed on the STATUS page of the MXP cytometer software.

If the laser power deviates more than ±1%, a *Laser Power Error [4206]* is displayed on the Status Bar and the system will not run a sample until the error message is no longer displayed. Follow the instructions in the Troubleshooting section for handling this error.

In order to extend the life of the argon laser, when the FC 500 flow cytometer is in idle mode, the laser power will be less than 8 mW. Once the instrument is taken out of idle mode, the laser power will return to 20 mW.

Thus, while operational and out of idle mode, the laser power specifications are 20±1 mW.

Beam-Shaping Optics

Cross cylindrical lenses 10 mm by 80 mm.

Argon Laser Beam Spot Size

An elliptical spot 10-µm high by 80-µm wide.

Solid-State Laser Beam Spot Size

It approximates the beam spot size for the Argon laser.

Optical Filters

For the filters used in the single laser filter block and the dual laser filter block configurations, see Figure 5.6 and Figure 5.7 in the Instructions For Use manual.

- 500 nm long pass (LP) filter
- 530 nm (and 620 nm for dual laser configuration) short pass (SP) filter
- 488 nm, 550 nm, 600 nm, and 710 nm dichroic, long-pass (DLP) filters
- 615 nm or 645 nm dichroic, short-pass (DSP) filter

- 525 nm, 575 nm, 675 nm (and 620 nm for single laser configuration) band-pass (BP) filters
- 755 nm long-pass (LP) filter

  Note: The 755 LP filter is functioning effectively as a BP filter for FL5.

Sensors

- The FS sensor and the SS sensor are photodiodes.
- The five FL sensors are photo-multiplier tubes (PMTs) that have a 185 nm to 900 nm spectral range.

Signal Processing

- High voltage amplification, minimum 250 up to 1,100, in increments of 1, for:

  FL1
  FL2
  FL3
  FL4
  FL5

- Vernier gain (fine amplification), up to 1,000 (labeled volts), in increments of 1, for the following. A change of 1 to 750 represents a 1-to-4 change in gain:

  FS
  SS
  AUX

- Linear amplification (gain) by 1.0, 2.0, 5.0, 7.5, 10, 20, 50, 75, 100, 200, 500 or 750 for:

  FS
  SS

- Linear amplification (gain) by 1.0, 2.0, 5.0, 7.5, 10, 20, 50 or 75 for:

  FL1
  FL2
  FL3
  FL4
  FL5

- Linear amplification (gain) by 1.0, 2.0, 5.0, 7.5, 10, 20 50 or 75 for:

  AUX

- Four-decade digital logarithmic transformation of:

  FS
  SS
  FL1
  FL2
  FL3
  FL4
  FL5

  Note: A scale of 0.1 to 1,000 is displayed on the plot axis for logarithmic parameters, but the default statistics are based on an actual scale of 0.1024 to 1024. The displayed scale can be changed to 1 to 10,000.

- Fluorescence color compensation is available in 0.1 increments, from 0 to 100%, for:

  FL1
  FL2
  FL3
  FL4
  FL5

- A discriminator (maximum value of 1,023) is available for one of the following signals. Only one discriminator can be specified for any one sample acquisition.

  FS
  SS
  FL1
  FL2
  FL3
  FL4
  FL5
  AUX

Workstation

The descriptions below are approved configurations. Contact your Beckman Coulter Representative on current configuration availability.

Computer

Intel® Pentium® 4 microprocessor with a minimum of 256 MB of RAM.

Data Storage

- 3.5-in., 1.44-MB diskette drive.
- 20-GB (minimum) nonremovable hard disk.
- 700-MB CD-RW drive
- 250-MB (minimum) internal ZIP® drive

Interfaces

- Windows® 2000 or Windows XP
- Bidirectional asynchronous serial interfaces for communication with mainframe and personal computers.

Input Devices

- PS/2 optical Intellimouse®
- Full size PS/2 keyboard.

Monitor Options

Color LCD with a 17-in. flat screen.

3.3 SOFTWARE SPECIFICATIONS

Data Output and Compatibility

Output and compatibility features include:

- Flow Cytometric Standard (FCS) file format for listmode and histogram files. Listmode files contain an FCS 2.0 dataset followed by an FCS 3.0 dataset.
- Copy and Paste, or Drag and Drop plots images to third party programs (such as, MS Word)
- Full-color printouts with the appropriate optional Printer.
- Printout of sample results with FlowPAGE and desktop printing
- PDF format for Acquisition or FlowPAGE printouts
- Printout of Worklist for the MPL
- Export data to MS Excel
- Export billing information to MS Excel.
- Save/export data as a text file.

Setup Mode

During Setup mode the workspace is a rolling display that is updated up to three times per second. The maximum number of events can be set on the Cytometer Control Acquisition Setup Tab. The incoming data is not saved.

Acquisition

During data acquisition, the plots are updated in real time. When one plot is displayed with statistics underneath, the statistics are also updated in real time.

Unlimited one or two parameter plots are available for any given sample.

One-parameter plots have 1,024-channel resolution.
Two-parameter plots have up to 512- x 512-channel resolution.

Regions

Up to 32 gates and 256 analysis regions are available for gating, analysis, and autogating per protocol. Up to 8 of those regions can be used to create any one gate.

The following types of regions are available for gating and analysis:

- Linear
- Rectangular
- Quadrant
- Polygonal
- Elliptical
- Contour.

Listmode Analysis

The instrument can store up to 16 parameters including AUX, TIME, and RATIO as listmode data. The amount of available random access memory (RAM) in the computer determines the maximum size of a listmode file.

MXP Default File Extensions

MXP has a variety of standard file extensions. Many of these file extensions are not necessary for MXP itself but are required for compatibility with other programs.

Panel, Protocol and Worklist files are written as pure ASCII text files and can be read and edited by any ASCII text editor such as Windows Notepad or the MS-DOS Edit command.

The advantage of using ASCII text to describe the set-up information means that protocol save and restore queries or errors can easily be identified and perhaps even explained or corrected by fax or telephone support.

Standard (Default) Files and File Extensions

*.ALQ	Queue of listmode files saved in AutoMATOR.
*.LMD	FCS listmode data file (includes ASCII header information and binary listmode data).
*.HST	FCS histogram file, single parameter only per file. (Includes ASCII text file descriptions and binary histogram channel information).
*.PGE	FlowPAGE files.
*.PRO	Protocol files.
*.PNL	Panel files.
*.WLS	Worklist files.
*.CMP	Compensation files.
*.PPP	Listmode compensation panel.
*.PDF	Files created when “Print to PDF” is selected.
*.TDF	Plate definition files. Also applies to a folder that holds the listmode files for a plate.
*.KIT	Reagent kit assay definition files.
*.WLQ	Playback worklist files (listmode files and protocols).

*Output.Txt files are created for the Plate Data Displays.

The following characters cannot be included in a file name: forward slash (/), backslash (\), greater than sign (>), less than sign (<), asterisk (*), comma (,), question mark (?), quotation mark ("), pipe symbol (|), colon (:), or apostrophe (‘). Leading, trailing and multiple spaces are not allowed.

Default AutoSetup Protocols and Panels - Administrator

The following AutoSetup panels and protocols are included with MXP software. These files are located in the C:\MXP\admin directory.

Panel Name	Flow-Set Protocol	Compensation Protocols	Verification Protocol	Settings Protocol
AS 2C.PNL	AS 2C Flow-Set.Pro	AS FL1 Comp.Pro AS FL2 Comp.Pro	AS 2C Verify.Pro	AS 2C [Settings].Pro
AS 3C 1L.PNL	AS 3C 1L Flow-Set.Pro	AS FL1 Comp.Pro AS FL2 Comp.Pro AS FL4 Comp.Pro	AS 3C 1L Verify.Pro	AS 3C 1L [Settings].Pro
AS 4C 1L.PNL	AS 4C 1L Flow-Set.Pro	AS FL1 Comp.Pro AS FL2 Comp.Pro AS FL3 Comp.Pro AS FL4 Comp.Pro	AS 4C 1L Verify.Pro	AS 4C 1L [Settings].Pro
AS 4C 2L.PNL	AS 4C 2L Flow-Set.Pro	AS FL1 Comp.Pro AS FL2 Comp.Pro AS FL3 Comp.Pro AS FL4 Comp.Pro	AS 4C 2L Verify.Pro	AS 4C 2L [Settings].Pro
AS 5C 1L.PNL	AS 5C 1L Flow-Set.Pro	AS FL1 Comp.Pro AS FL2 Comp.Pro AS FL3 Comp.Pro AS FL4 Comp.Pro AS FL5 Comp.Pro	AS 5C 1L Verify.Pro	AS 5C 1L [Settings].Pro
AS 5C 2L.PNL	AS 5C 2L Flow-Set.Pro	AS FL1 Comp.Pro AS FL2 Comp.Pro AS FL3 Comp.Pro AS FL4 Comp.Pro AS FL5 Comp.Pro	AS 5C 2L Verify.Pro	AS 5C 2L [Settings].Pro

The initial protocol in each panel, which you use to adjust or confirm correct PMT High Voltage and parameter gain settings, utilizes Flow-Set fluorospheres.

If you wish to use a negative control sample use the appropriate “AS * Neg Ctrl.Pro” protocol to replace the Flow-Set protocols in the above panels. These negative control protocols have been provided:

Negative Control Protocols	
AS 2C neg control.pro	AS 4C 2L neg control.pro
AS 3C 1L neg control.pro	AS 5C 1L neg control.pro
AS 4C 1L neg control.pro	AS 5C 2L neg control.pro

All the supplied protocols may be copied and modified, care should be taken to ensure all protocols have the same axis calibration to maintain correct functioning of the Compensation Wizard.

Default AutoSetup Protocols and Panels - All Users

The following AutoSetup panels and protocols are included with MXP software in each User's directory set up by the System Administrator.

If you have the 21 CFR Part 11 option installed on your system, see the heading Resource Explorer for instructions how to check in these files for your use.

Panel Name	Flow-Set Protocol	Compensation Protocols	Verification Protocol	Settings Protocol
AS 5C 1L.PNL	AS 5C 1L Flow-Set.Pro	AS FL1 Comp.Pro AS FL2 Comp.Pro AS FL3 Comp.Pro AS FL4 Comp.Pro AS FL5 Comp.Pro	AS 5C 1L Verify.Pro	AS 5C 1L [Settings].Pro
AS 5C 2L.PNL	AS 5C 2L Flow-Set.Pro	AS FL1 Comp.Pro AS FL2 Comp.Pro AS FL3 Comp.Pro AS FL4 Comp.Pro AS FL5 Comp.Pro	AS 5C 2L Verify.Pro	AS 5C 2L [Settings].Pro

Default Generic Panels and Protocols - All Users

The following generic panels and protocols are included with MXP software in each User's directory set up by the System Administrator.

If you have the 21 CFR Part 11 option installed on your system, see the heading Resource Explorer for instructions how to check in these files for your use.

Panel Name	Protocols
Cleanse.PNL	Cleanse Bleach.pro Cleanse Water.pro

Protocols		
2c 1L.pro	4c 2L.pro	QC 1L Flow-Check.pro
3c 1L.pro	5c 1L.pro	QC 2L Flow-Check.pro
4c 1L.pro	5c 2L.pro	HeNe Alignment.pro

FCS Header - Keyword Reference

The Following FCS keyword information is included in MXP listmode and histogram file header section.

Those prefixed by a "$" are FCS Standard defined keywords, those prefixed by an "@" or nothing are MXP defined keywords.

FCS Keyword	Key value
$DATATYPE	Single character defining base data type of binary data, I=16 bit integer, F=IEEE 32 bit floating point, D=double precision 64 bit floating point, A=ASCII
$PAR	Number of parameters
$MODE	Single character defining mode of data, L=listmode, C=dual parameter correlated, U=single parameter uncorrelated.
$PnB	Number of bits allocated to store data for parameter n, 8 means 256 channel data, 16 means up to 64 k channel data
$PnR	Channel resolution of parameter n, for example: 256,1024 and so on
$BYTEORD	INTEL platform '1,2', Motorola platform '2,1'
$NEXTDATA	Byte offset into binary data for next data item, FCS files can be saved as a pseudo-linked list, most often 0
$DATE	DD-MM-YY
$EXP	Experiment name (from Workspace Preferences)
$PROJ	Project name (from Workspace Preferences)
$OP	Operator ID, that is, user name.
$INST	Institute name (from Workspace Preferences)
$FIL	File name excluding path
$CYT	Type of flow cytometer, for example: FC 500 MPL
$SMNO	System defined run number, that is, a number which is incremented each time the flow cytometer is used to acquire data
$SRC	SAMPLEID1
$SYS	MXP Intel Windows
$CELLS	Cells name (from Workspace Preferences)
$BTIM	Start time (HH:MM:SS 24 hour clock ':' delimiters)
$ETIM	End time (HH:MM:SS 24 hour clock ':' delimiters)
$TOT	Total number of events acquired
$PnV	Voltage of sensor n
@PnGAIN	Amplifier Gain setting of a sensor
$PnN	Name of parameter n, for example: Manufacturer assigned name, that is, FS or FL1 LOG
$PnS	User assigned name of parameter
$PnE	Lin/Log parameter calibration (0,0) means linear, (decades, offset [for example: 4,0.1]) means log

FCS Keyword	Key value
$DFCiToj	% of FLi to subtract from FLj
@Y2KDATE	Date in format YYYYMMDD
@SAMPLEID1	User defined string
@SAMPLEID2	User defined string
@SAMPLEID3	User defined string
@SAMPLEID4	User defined string
@PnZ	Calibration for parameter n is active when this key value is 'ON'
@PnX	Linear calibration values in xx, yy order, for example: xx= channel number, yy = channel value
@PnU	Units for this parameter n
@PnQ	Sensor name for parameter n, from the CCUI.
@PnC	Calculation method for parameter n, 'ARITHMETIC' means use arithmetic method for calculation - may be overridden by analysis engine
@PnADDRESS	Mutliplexor address of parameter n
$RUNNUMBER	(See $SMNO) System defined run number, that is, a number which is incremented each time the flow cytometer is used to acquire data
@BASELINEOFFSET	Default is 'OFF' any other means ON, that is, this sample was acquired using baseline offset
@FILEGUID	Unique 128 bit number identifying this file, changed every time the file is saved.
@CYTOMETERID	The unique ID given to the flow cytometer by the user, for example: the flow cytometer serial number
@LOCATION	The address of the institute who owns the flow cytometer
TESTNAME	PROTOCOL NAME
TESTFILE	PROTOCOL FILE NAME
@BARCODE	No Read
@CAROUSEL	1
@TUBENO	Well number - corresponds to the number that appears within the well displayed on the Plate Wizard. Example: 01, 02, 96.
@PnDIVIDER	Prism channel divider (0xFFFF means OFF)
@COMPENSATIONMODE	Displays the method of compensation implemented Advanced or Classic
@Discriminator	Displays the discriminator parameter and level
@REDLASER	Displays the status of the Red Laser during analysis of the sample.
@TARGETLASERPOWER	Displays the Argon Laser power set during acquisition
@RESAVEDFILE	Displays Runtime Protocol if the current file is exactly as at the end of acquisition, if any changes are made post acquisition and the LMD file is resaved the new file displays New Protocol.
@RATIONUMERATORMUX	Internal Mux address of the parameters used for the Ratio Parameter Numerator.

FCS Keyword	Key value
@RATIODENOMINATORMUX	Internal Mux address of the parameters used for the Ratio Parameter Denominator.
@PANEL	Name of the panel file used for acquisition of the sample.
@ACQUISITIONPROTOCOLOFFSET	Defines where in the LMD file the Runtime Protocol is stored, the value displayed is number of bytes from start of file to the start of the protocol section.
@ABSCALFACTOR	Defines the calibration factor of the beads used with this sample if absolute calibration particles are used.
@TRAYID	Plate ID Name (*.tdf file name)
@TRAYROWCOL	Well location, designated by both a row letter and a column number. Example: A1, E40. Corresponds to the well location displayed on the Plate Wizard.
@TRAYANALYSIS	Sequential analysis code number assigned by the instrument to the plate.

3.4 PERFORMANCE SPECIFICATIONS

Carryover

Scatter and fluorescence carryover is less than 1% from one specimen to another when the number of gated events is 10,000 or greater.

Data Acquisition Throughput

Acquisition throughput is dependant on many variables, including flow rate, data rate, number of parameters collected, gated events, data plots FlowPAGE reports and printouts generated. As an example, a maximum cycle time is 45 seconds/well or tube when aspirating 100 µL of Flow-Check fluorospheres using the QC 1L Flow-Check standard protocol. Changing these variables, such as decreasing the number of events collected, increasing sample concentration, or increasing the flow rate can increase your acquisition throughput; while increasing the number of events collected or running at a lower data rate can decrease your acquisition throughput.

Precision for Surface Markers

See reagent package insert for precision specifications of other surface markers.

Resolution

Forward Scatter

The HPCV of the integral signal intensity values using Flow-Check fluorospheres is <2%.

Fluorescence

The HPCV of the integral signal intensity values using Flow-Check fluorospheres is <2% for FL1-FL4 from the Argon laser. The HPCV of the integral signal intensity values using the Flow-Check 675 fluorospheres is ≤ 2.5% for FL4 from the red laser. The HPCV of the integral signal intensity values using Flow-Check 770 fluorospheres is ≤ 4% for FL5.

Sensitivity

Scatter

Detects 0.5 µm - 40 µm diameter particles.

Fluorescence

600 (FITC), 300 (PE) and 600 (APC) molecules of equivalent fluorochrome when measured with Spherotech™ Rainbow Calibration particles (FITC & PE), Molecular Probes LinearFlow™ Intensity Calibration particles (APC) and IsoFlow sheath fluid.

Stability

Day-To-Day

The mean channel value of the integral signal intensity of Flow-Check fluorospheres from the 488 nm laser for FS, FL1, FL2, FL3, and FL4 does not vary more than ±5% over a period of 7 days, when the temperature does not vary more than ±5°F from temperature at alignment. Refer to the Flow-Check fluorospheres package insert for details.

Stability for FL5 (PC7) mean channel value of the integral signal intensity from the 488 nm laser using Flow-Check 770 beads does not vary more than ±5% from the average of the integral signal intensity mean channel values obtained over a 7 day period, when room temperature does not vary more than ±5°F from temperature at alignment. Refer to the Flow-Check 770 fluorospheres package insert for details.

Stability for FL4 (APC) mean channel value of the integral signal intensity from the red laser using Flow-Check 675 beads does not vary more than ±5% from the average of the integral signal intensity mean channel values obtained over a 7 day period, when room temperature does not vary more than ±5°F from temperature at alignment. Refer to the Flow-Check 675 fluorospheres package insert for details.

Within Day

The mean channel value of the integral signal intensity of Flow-Check fluorospheres from the 488 nm laser for FS, FL1, FL2, FL3, FL4 and FL5 does not vary more than ±5% from the mean integral signal channel number obtained within a period of 24 hours, when the temperature does not vary more than ±5°F from temperature at alignment. Refer to the Flow-Check fluorospheres package insert for details.

Stability for FL5 (PC7) mean channel value of the integral signal intensity from the 488 nm laser using Flow-Check 770 beads does not vary more than ±5% from the average of the integral signal intensity mean channel values obtained within a period of 24 hours, when room temperature does not vary more than ±5°F from temperature at alignment. Refer to the Flow-Check 770 fluorospheres package insert for details.

Stability for FL4 (APC) mean channel value of the integral signal intensity from the red laser using Flow-Check 675 beads does not vary more than ±5% from the average of the integral signal intensity mean channel values obtained within a period of 24 hours, when room temperature does not vary more than ±5°F from temperature at alignment. Refer to the Flow-Check 675 fluorospheres package insert for details.

This appendix contains the following log sheets:

- Reagent Log
- Action Log
- Flow-Set Fluorospheres Charts
  - Daily Log for Instrument Standardization
  - Establishing HV/Total Gain Ranges
- Flow-Check Fluorospheres Charts
  - Daily Log for Instrument Verification of Alignment and Fluidics
  - Establishing Peak Position and HPCV Target Ranges

Make photocopies as needed.

REAGENT LOG

Reagent Name	Concentration Units= _____ (If applicable)	Date Received	Date Opened	Lot Number	Expiration Date	Tech

Cytometer Serial No: _____

Laboratory: _____

Cytomics FC 500 MPL

BECKMAN COULTER

7579022A

ACTION LOG

Date	Condition Noted	Tech	Date	Action Taken	Tech

Cytometer Serial No: _____

Laboratory: _____

Cytomics FC 500 MPL

BECKMAN COULTER

7579023A

DAILY LOG FOR INSTRUMENT STANDARDIZATION

Application _____

Flow-Set Fluorospheres Lot Number _____ Expiration Date _____

Flow-Set 675 Fluorospheres Lot Number _____ Expiration Date _____

Flow-Set 770 Fluorospheres Lot Number _____ Expiration Date _____

Instrument HV/Total Gain Target Ranges:

FS _____ LOG FL1 _____ LOG FL3 _____

SS/LOG SS _____ LOG FL2 _____ LOG FL4 _____ LOG FL5 _____

	FS			SS or LOG SS			LOG FL1		LOG FL2		LOG FL3		LOG FL4 Red laser ☐ 488 ☐		LOG FL5		
Run	Mode	HV*	Gain	Mode	HV	Gain	Mode	HV	Mode	HV	Mode	HV	Mode	HV	Mode	HV	Tech/ Date
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
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22																	
23																	
24																	
25																	
26																	
27																	
28																	
29																	
30																	

Cytometer Serial No: _____

Laboratory: _____

Cytomics FC 500 MPL

BECKMAN COULTER

7579024B

ESTABLISHING HV/TOTAL GAIN RANGES

Application _____

Flow-Set Fluorospheres Lot Number _____ Expiration Date _____

Flow-Set 675 Fluorospheres Lot Number _____ Expiration Date _____

Flow-Set 770 Fluorospheres Lot Number _____ Expiration Date _____

Mode Target Ranges:

FS _____ LOG FL1 _____ LOG FL3 _____

SS/LOG SS _____ LOG FL2 _____ LOG FL4 _____ LOG FL5 _____

	FS			SS or LOG SS			LOG FL1		LOG FL2		LOG FL3		LOG FL4 Red laser ☐ 488 ☐		LOG FL5		
Run	Mode	HV	Gain	Mode	HV	Gain	Mode	HV	Mode	HV	Mode	HV	Mode	HV	Mode	HV	Tech/ Date
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
Average HV/Gain																	
Average +2SD or +1%																	
Average -2SD or -1%																	

Cytometer Serial No: _____

Laboratory: _____

Cytomics FC 500 MPL

BECKMAN COULTER

7579025B

DAILY LOG FOR INSTRUMENT VERIFICATION OF ALIGNMENT AND FLUIDICS

Flow-Check Fluorospheres Lot Number _____ Expiration Date _____

Flow-Check 675 Fluorospheres Lot Number _____ Expiration Date _____

Flow-Check 770 Fluorospheres Lot Number _____ Expiration Date _____

Target Range	FS		FL1		FL2		FL3		FL4 Red laser ☐ 488 ☐		FL5		
Run	Mode	HPCV	Mode	HPCV	Mode	HPCV	Mode	HPCV	Mode	HPCV	Mode	HPCV	Tech/Date
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
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20													
21													
22													
23													
24													
25													
26													
27													
28													
29													
30													
31													

Cytometer Serial No: _____

Laboratory: _____

Cytomics FC 500 MPL

BECKMAN COULTER

7579026B

ESTABLISHING PEAK POSITION AND HPCV TARGET RANGES

Flow-Check Fluorospheres Lot Number _____ Expiration Date _____

Flow-Check 675 Fluorospheres Lot Number _____ Expiration Date _____

Flow-Check 770 Fluorospheres Lot Number _____ Expiration Date _____

	FS		FL1		FL2		FL3		FL4 Red laser ☐ 488 ☐		FL5		
Run	Mode	HPCV	Mode	HPCV	Mode	HPCV	Mode	HPCV	Mode	HPCV	Mode	HPCV	Tech/Date
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													
Mean													
SD													
+2SD													
-2SD													

Cytometer Serial No: _____

Laboratory: _____

Cytomics FC 500 MPL

BECKMAN COULTER

7579027B

IMPORTANT If a laboratory wants both MXP and CXP Analysis software installed on an FC 500 MPL, consider the following:

- CXP Analysis software must always be installed before the MXP software is installed. If CXP Analysis software is installed on a Workstation with a previously installed version of MXP software, lockups may be observed in the MXP software when executing the AutoSetup Wizard.
- CXP Analysis software must always be installed in the CXP directory, not the MXP directory. If CXP Analysis software is installed in the MXP directory, the CXP Analysis Help files replace the MXP Help files so the MXP Help files are no longer available for access on the FC 500 MPL.

B.1 WELCOME TO MXP SOFTWARE

Welcome to MXP software. This exciting new software, designed in conjunction with customer feedback, is simple, fast and reliable, allowing you to obtain the best from your Cytometer.

B.2 CHECK FOR BCA&P DATABASE ICON

Before you launch the MXP software, check that this icon appears in the Windows system tray. This indicates the BCA&P database is online.

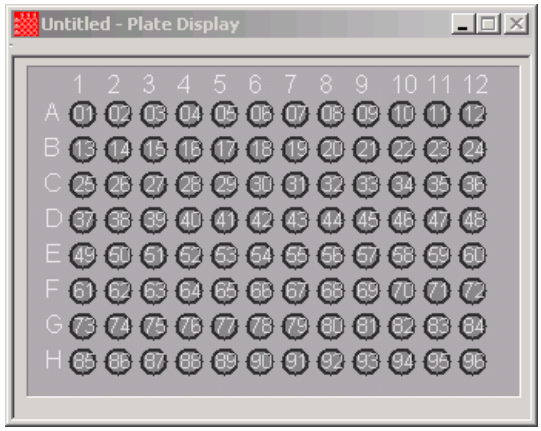


B.3 MULTI-USER SIGN ON

Plate Display

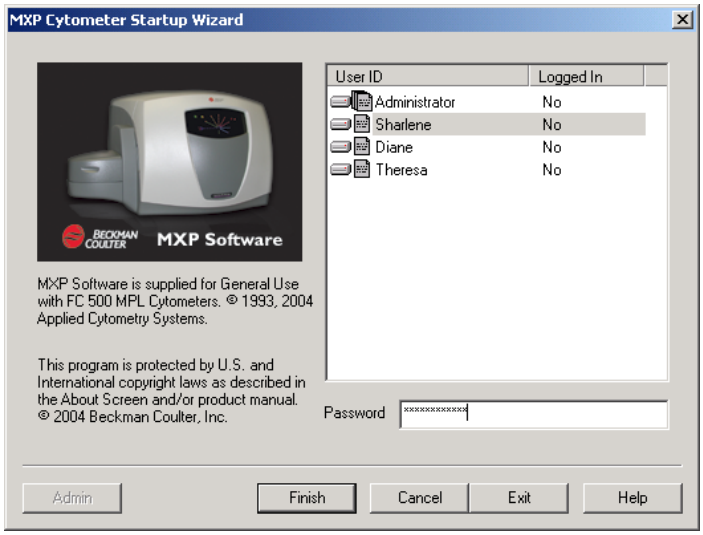
The Plate Display appears with a default undefined 96 well plate configuration. Once a user logs on, the Plate Display window shows the last plate configuration defined by that user.

Note: When anyone logs in with a new User ID, *Not a valid worklist file* appears when the MXP software is launched. Until a valid worklist is saved for that User ID, this message appears after log in.



Startup Wizard

User ID
Logged In
Password
Admin Button
Finish Button



Note: The System Administrator should refer to the System Administrator's Guide for detailed instructions about this screen and the System Administrator tools.

After the default Plate Display appears, the Startup Wizard screen appears allowing Password entry and access to the MXP software.

On the initial Startup after installation, only the Administrator User ID is available. Some User IDs may appear on the initial Startup after installation if the System Administrator migrated these User IDs from a previously installed version of the MXP software. All User IDs must first be set up by the System Administrator before they can log into the MXP software.

The Startup Wizard screen displays the User IDs of all those who have access rights to MXP software and whether they are logged in to the system or not.

If you have been previously set up on the system, highlight your User ID and enter your Password. The first time you log in after you were set up by the System Administrator, the system prompts you to change your Password at the **Password Change** dialog box that appears. The System Administrator cannot view any password you create.

If nothing happens or an *Account Disabled* message appears when you log in, ask your System Administrator to unlock your User ID.

If you do not have a User ID and Password, see your System Administrator.

The User ID "Administrator" and Admin are for the System Administrator's use only. You cannot log into the standard MXP software with the Administrator User ID. If you have the 21 CFR Part 11 option, the System Administrator can use the **File** ▸▸ Log In feature to log into the MXP software but only after an automatic logout timeout or a user-requested software lock.

Note: If a red X appears next to your User ID (techcomm) notify the System Administrator. Instructions are contained in the System Administrator's Guide.

Log Into and Log Out of DaCS Software

If you have the 21 CFR Part 11 option, when you log into MXP software no additional actions are needed to be automatically logged into the DaCS software when data is exported to MS Excel. When you are logged into MXP software, the MXP software User IDs are also used by the DaCS software. When you log out of MXP software, you are automatically logged out of the DaCS software.

User ID

This lists all the User IDs that are allowed access to the system. User IDs are set up by the System Administrator. If your name is not included, see your System Administrator.

Logged In

Indicates whether or not the Users are logged in.

Password

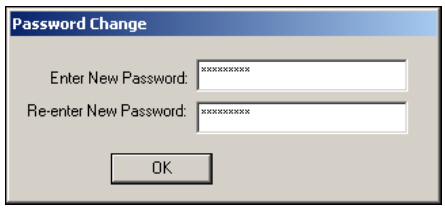
Enter your User Password. Passwords are a minimum of 6 characters and a maximum of 24 characters. Blanks are not allowed. For best security create a password with at least eight characters, including letters, numbers (0-9) and/or symbols.

If you exceed the number of unsuccessful password attempts allowed per the System Administrator, you will not be allowed to log into the MXP software. You must then ask your System Administrator to unlock you and/or reset your password before you can log into MXP software.

The system prompts you with a *Password No Longer Valid* message whenever you must change your password. You must change your password:

- The first time you log into MXP software after the software was installed.
- The first time you log into MXP software after the System Administrator has reset your password.
- Each time your password expires. Your System Administrator sets up the time interval when you must change your password.

Use the **Password Change** dialog box that appears to enter and confirm your new password.



Admin Button

Allows the System Administrator access to the User Administration Tools.

Finish Button

Starts up MXP software after you select your User ID and enter your password.

B.4 TOOLBAR BUTTONS

Toolbars form an essential part of the MXP software. The application entered and the mode you are operating at the time determines whether a particular Toolbar display is available.

Toolbars can be moved using the Drag and Drop method with the mouse around the MXP software desktop or customized to suit the preferences of each user.

See
Toolbars - Customize Toolbars.

The Toolbar elements are:

FILE OPTIONS TOOLBAR
PLOT OPTIONS TOOLBAR
REGIONS OPTIONS TOOLBAR
GATE, COLOR, STATS AND HELP TOOLBAR
FLOWPAGE TOOLBAR
ACQUISITION MANAGER TOOLBAR
AUTOMATOR TOOLBAR
CYTOMETER TOOLBAR.
LISTMODE PLAYBACK TOOLBAR

B.5 FILE OPTIONS TOOLBAR

The following Icon Buttons are shown within the File Options Toolbar.

	**Open**	Open the **Open Listmode Data File** dialog box.
	**Save**	Save all the FCS listmode data files that are currently open.
	**Save Protocol**	Save the Protocol with the current name. If the Protocol has not yet been Saved, the **Save Protocol As** dialog box is displayed.
	**Print**	Open the Print Plot printing dialog box.
	**Cut**	Cut an item previously selected and place it on the Clipboard.
	**Copy**	Copy a previously selected item into Clipboard while retaining it in its original position.
	**Paste**	Paste a previously Cut or Copied item from Clipboard into the desired position.
	**Undo**	Undo the previous command. By clicking the mouse on the down arrow symbol, a list of previous actions that can be Undone is displayed.
	**Redo**	Redo the previous Undo command. By clicking the mouse on the down arrow symbol, a list of previous actions that can be Redone is displayed.

B.6 PLOT OPTIONS TOOLBAR

	**Color Dot Plot**	Create a Color Dot Plot and specify the plot properties.
	**Histogram Plot**	Create a Histogram Plot and specify the plot properties.
	**Contour Plot**	Not available in MXP software.
	**Density Plot**	Create a Density Plot and specify the plot properties.
	**Overlay Plot**	Not available in MXP software.
	**Tomogram Plot**	Not available in MXP software.
	**Surface Plot**	Not available in MXP software.
	**Prism Plot**	Create a Prism Plot and specify the plot properties.
	**Legend Plot**	Create a Legend Plot and specify the plot properties.

B.7 REGIONS OPTIONS TOOLBAR

 **Polygonal Region**	Insert a Polygonal Region into a dual parameter plot. The region is a free-form with up to 100 points. It can include horizontal acute angles but not vertical re-entrant angles.
 **Rectangular Plot**	Insert a Rectangular Region into a dual parameter plot.
 **Quadrant Region**	Insert a Quadrant Region into a dual parameter plot. All quadrants comprise four sets of Rectangular Regions on a dual parameter plot.
 **Elliptical AutoGate**	Create an Elliptical AutoGate around the selected population on a plot.
 **Contour AutoGate**	Create a Contour AutoGate around the selected population on a plot.
 **Edit Both Prism Dividers**	Create or Edit a Dual Parameter plot with a set of Dual Prism Dividers.
 **Single Linear Region**	Insert a Linear Region.
 **Multiple Linear Region**	Insert Multiple Linear Regions.
 **Edit Single Prism Divider**	Create a Single Parameter Prism Divider.

B.8 GATE, COLOR, STATS AND HELP TOOLBAR

 **Create / Modify Gate**	Access the Create / Modify Gates dialog box.
 **Modify Color Gate Blend Setup**	Access the Modify Color Gate Blend Setup dialog box.
 **Create / Modify Color Gate Precedence Setup**	Access the Create / Modify Color Gate Precedence Setup dialog box.
 **View Current Regions**	View/edit a Region's properties, Region points or to delete a Region that is no longer required.
 **Publish Results**	Publish the statistics to an MS Excel spreadsheet or a Text file depending on your Workspace Preferences selection.
 **Select Results**	Choose Statistics for display and export.
 **Help**	Access the Help System.
 **Beckman Coulter**	Go to the Beckman Coulter, Inc. web site.
 **ACS**	Go to the Applied Cytometry Systems web site.

B.9 FLOWPAGE TOOLBAR

New FlowPAGE	Open a New FlowPAGE – Also see Insert/Blank FlowPAGE.
Insert Bit Map	Insert a Picture into a FlowPAGE.
Annotation	Add a Text Box to a FlowPAGE.
Line	Draw a Line on a FlowPAGE to enhance the graphical layout of the page.
Rectangle	Insert a Rectangle into a FlowPAGE that can be used as a border for Pictures or Text Boxes.
Align Top	Align all the selected items to the top of the selection area.
Align Bottom	Align all the selected items to the bottom of the selection area.
Align Left	Align all the selected items to the left of the selection area.
Align Right	Align all the selected items to the right of the selection area.
Space Evenly Across	Space selected items within a FlowPAGE evenly across a page.
Space Evenly Down	Space selected items within a FlowPAGE evenly down a page.
Grow to Largest	Resize the selected items to all be the same size as the reference item.
Shrink to Smallest	Resize the selected items to all be the same size as the reference item.

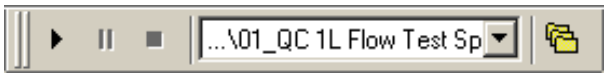
B.10 ACQUISITION MANAGER TOOLBAR

New Plate	Open the Plate Wizard.
Reload Plate	Copy the Worklist from the last plate that was run.
Reanalyze Current Plate	Not available in MXP software.
Print	Print the current Worklist.

Note: The Listmode File Name column displays only a provisional file name (including the well number) prior to acquisition. If Time or Run Number is included as part of the name the actual value of these fields can only be determined once acquisition of each sample is complete. Therefore, if you wish to print a worklist including the final listmode file names, only do so once acquisition of all samples in the Worklist is complete.

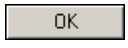
B.11 AUTOMATOR TOOLBAR

The AutoMATOR Toolbar allows shortcuts to commonly used AutoMATOR functions.





AutoMATOR Setup Display the AutoMATOR Setup dialog box.

Once all alterations have been made,  

. The toolbar becomes active once all files have been entered. A list of the first file for each panel (usually the Control files) is shown allowing you to choose the batch required to run first.



The rest of the files follow in order after the selected panel.



Stop Cancel the batch run. This aborts the current panel. When the panel runs again, the test starts from the beginning.



Run Start the batch running. The AutoMATOR Status Bar appears showing the status of the tests, that is, if it is currently paused, still running, and so on.



Pause Pause has two states:

- Continuous Pause

  Pause the tests for modifications and remain on pause until you decide that the test will continue. This function allows the test to stop without reverting to the beginning of the panel again. To resume the test, click the Pause button again.

- Auto Pause

  The run of tests will pause and then carry on with the rest of the panel automatically after a 15 second wait. The countdown is displayed on the Automator Status Bar. When the tests are in the Auto Pause setting, you can hold down the Shift key and click the Pause button. The Shift key overrides the Auto Pause, placing the Automator into Continuous Pause. To restart, click the Pause button again and the test resumes from the point at which it was paused.

B.12 CYTOMETER TOOLBAR

 **Restart Acquisition**	Reset the current acquired events to zero and clear the current data in memory. Acquisition restarts at zero events and continues until a stop condition is reached.
 **Start Acquisition** (F9)	Start acquisition.
 **Stop Acquisition** (F10)	Stop the Acquisition of the current sample and output results.
 **Abort Acquisition** (F12)	Stop the Acquisition without saving data or outputting reports. Can use with Reload Plate.
 **Idle Mode**	Place the Cytometer in Idle mode in order to perform various cleaning and replacing procedures.
 **Prime**	Flush the sample line and flow cell with sheath fluid to declog or remove bubbles.
 **Cleanse**	Flush the sample line and flow cell with cleaning agent.
 **Cytometer Controls**	Display the Cytometer Control dialog box to adjust the Cytometer settings. Click the button again to hide the dialog box.

B.13 LISTMODE PLAYBACK TOOLBAR

The listmode playback tool utilizes two sets of buttons - one for saving and restoring worklists (panels populated with listmode files) and one for saving and restoring queues (lists of listmode files).



Create a new Worklist (clear Worklist)



Save a Panel
Accesses the appropriate Save Panels dialog box depending upon whether you have standard MXP software or the 21 CFR part 11 option installed.



Add a Panel to the Worklist
Accesses the appropriate Open Playback Panels dialog box depending upon whether you have standard MXP software or the 21 CFR part 11 option installed.



Add a Well to the Worklist



Delete a Well from the Worklist



Play



Pause



Stop



Sort the Worklist



Minimize the Listmode Playback window



Load Playback Worklist



Save Playback Worklist



Load Listmode Queue
Accesses the appropriate Open Playback Panels Files dialog box depending upon whether you have standard MXP software or the 21 CFR part 11 option installed.



Save Listmode Queue
Accesses the appropriate Save Playback Panels Files dialog box depending upon whether you have standard MXP software or the 21 CFR part 11 option installed.



Replay Plate Worklist

B.14 FILE MENU

New Protocol

Use this option to create a New Protocol.

---

1 **File ▸▸ New ▸▸ New Protocol**. The **Save Existing Protocol?** dialog box is displayed.

---

2 If you **Yes**, the **Save Protocol File As…** dialog box is displayed. the folder in which you wish to Save the Protocol. Enter a valid File Name in File Name box and **Save**.

---

3 If the File Name already exists, a warning box is displayed.

- If you wish to replace the existing Protocol, **Yes**.
- Selecting the **No** option here allows you to enter a different Protocol File Name. Clicking **No** closes the existing Protocol file and clears the workspace.

See also:
Save Protocol As
Creating a Protocol for Analysis

Creating a New Acquisition Protocol

1 **File ▸▸ New ▸▸ New Protocol.**

2 **Parameters** button on the Cytometer Control Acquisition Setup Tab and choose the Parameters to be acquired.

3 Create the Plots required for acquisition.

4 If analysis is to be performed during acquisition, create the required Regions and Gates, and also select the required statistics from the **Analysis ▸▸ Select Results** option.

5 **File ▸▸ Save Protocol As** to save the protocol.

Creating a Protocol for Analysis

1 **File ▸▸ New ▸▸ New Protocol** to clear the Workspace of all Regions, gates, statistical definitions, and plots and load the default protocol. You can also Drag and Drop a listmode file into the Workspace (not into a plot) to load the runtime protocol.

2 **File ▸▸ Open Listmode File** to open a representative listmode data file (or Drag and Drop a listmode file into a plot).

3 To modify a plot:

Right mouse click on the plot and  Format Plot.

4 To create a plot:

a. Choose one of the buttons on the Plots Toolbar or use the Plots Menu to select a plot type.

b.  the correct parameters for the plot and 

.

c. Right mouse click on the plot and  Format Plot.

5 Modify or create subsequent plots and choose the required File, Parameters, Regions and any gates to be applied.

6 

 statistics output required



.

7  Save Protocol As and enter a protocol name.

New Panel

Use the Panel Wizard to create or edit a Panel for use in the Plate Wizard.

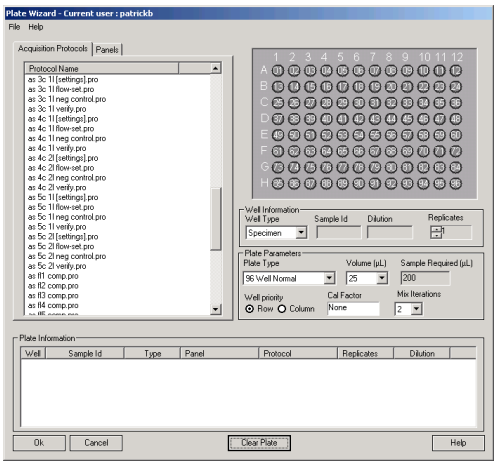
See Creating Panels or Editing Panels in the System Overview chapter in the Instructions For Use manual.

New Plate

Note: If no Worklist is visible, **View ▸▸ Acquisition Manager** to display the Worklist pane.

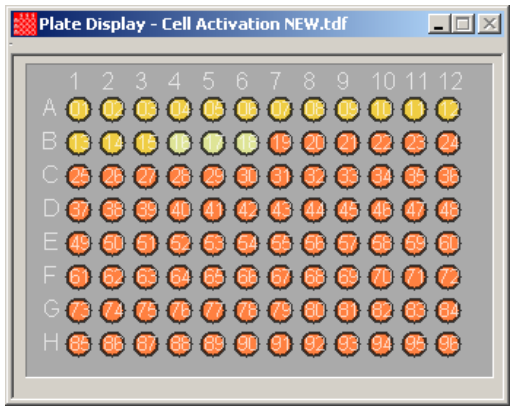
File ▸▸ New ▸▸ New Plate to open the Plate Wizard. The main MXP screen automatically minimizes when the Plate Wizard opens.

See Creating Worklists in the System Overview chapter in the Instructions For Use manual for detailed information how to program a new sample plate.



When you program a plate in the Plate Wizard and save the plate definition file (*.tdf) in the Trays directory, a Worklist and a Plate Display are created and displayed.

Plate Display



Worklist

	Panel	Protocol	P1	P2	P3	P4	P5	P6	Well Loc	Plate ID	Sample ID 1	Sample ID 2	Sample ID 3	Sample ID 4	LMD Filename	Regio Settin
1		2C Cell Activation.PRO	FS Lin	SS Lin	FL1 Log	FL2 Log	FL3 Log	FL4 Log	A1	Cell Activation NEW.tdf	Well 01	Calibrator	R_1	D_ = 1	01_00000000 001.LMD	
2		2C Cell Activation.PRO	FS Lin	SS Lin	FL1 Log	FL2 Log	FL3 Log	FL4 Log	A2	Cell Activation NEW.tdf	Well 02	Calibrator	R_2	D_ = 1	02_00000001 002.LMD	
3		2C Cell Activation.PRO	FS Lin	SS Lin	FL1 Log	FL2 Log	FL3 Log	FL4 Log	A3	Cell Activation NEW.tdf	Well 03	Calibrator	R_3	D_ = 1	03_00000002 003.LMD	
4		2C Cell Activation.PRO	FS Lin	SS Lin	FL1 Log	FL2 Log	FL3 Log	FL4 Log	A4	Cell Activation NEW.tdf	Well 04	Calibrator	R_1	D_ = 2	04_00000003 004.LMD	
5		2C Cell Activation.PRO	FS Lin	SS Lin	FL1 Log	FL2 Log	FL3 Log	FL4 Log	A5	Cell Activation NEW.tdf	Well 05	Calibrator	R_2	D_ = 2	05_00000004 005.LMD	

See also:
Acquisition Manager

Sample Plate Analysis with MPL_DaCSAnalysis Add-In or MPLAnalysis Add-In

Overview

There are two Add-Ins for use in Microsoft Excel supplied with MXP software:

- MPL_DaCSAnalysis Add-In
- MPLAnalysis Add-In.

See the System Administrator's Guide for instructions to install the MPL_DaCSAnalysis Add-In and the MPLAnalysis Add-In.

The Add-In you use depends upon whether or not your system has the 21 CFR Part 11 option installed on it:

- Use the MPL_DaCSAnalysis Add-In if you have the 21 CFR Part 11 option. The session of Microsoft Excel you will work in will be under the control of the DaCS software.
- Use the MPLAnalysis Add-In if you do NOT have the 21 CFR Part 11 option.

Both the MPL_DaCSAnalysis Add-In and the MPLAnalysis Add-In perform these functions:

- Produce specialized data displays in Microsoft Excel from MPL data acquisition.
- Organize the data from a sample plate running a single protocol for display in a spreadsheet.
- Search for the calibration data and uses it to generate a calibration curve. It tries to fit the data with a third order polynomial fit. The coefficients of fit are saved to calculate the concentrations.
- Organize the specimen and control data and generates the well plots, and if applicable, calculates the concentration for unknown specimens.
- Display a threshold value for wellplots (default is the average of the wellplots) and displays a red line at the threshold value in the wellplot and shades all values in the data columns that are above the threshold in red. The threshold value can be modified.

Working With MPL_DaCSAnalysis and MPLAnalysis Add-Ins

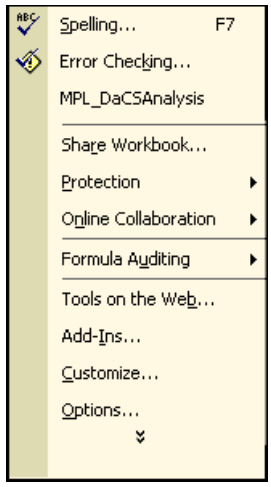
Perform this setup procedure in order to publish graphs and data spreadsheets into Excel from MXP software using the MPL_DaCSAnalysis or MPLAnalysis Add-In. You can use either Analysis Add-In when publishing from any of these features/conditions:

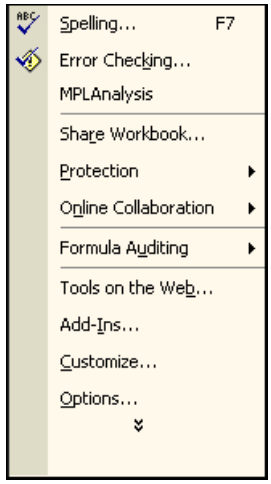
- AutoMATOR.
- LMD Playback Tool.
- LMD file currently on the desktop.
- Acquisition. Additional steps are needed to publish to Excel during acquisition and are noted in this procedure.

---

1 Ensure the MPL_DaCSAnalysis Add-In or MPLAnalysis Add-In is installed in Excel:

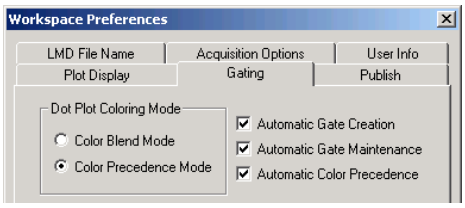
- **Tools** in Excel.
- The appropriate Add-In (**MPL_DaCSAnalysis** or **MPLAnalysis**) appears on the Tools menu.





2 In the MXP software, select **File ▸▸ Workspace Preferences.**

3 Click the **Gating** tab.

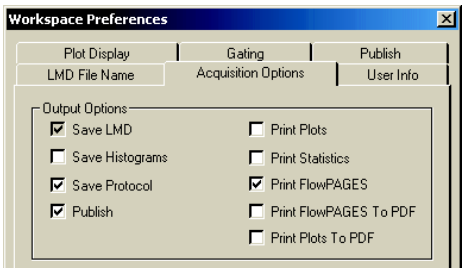


4 Click **Automatic Gate Maintenance**.

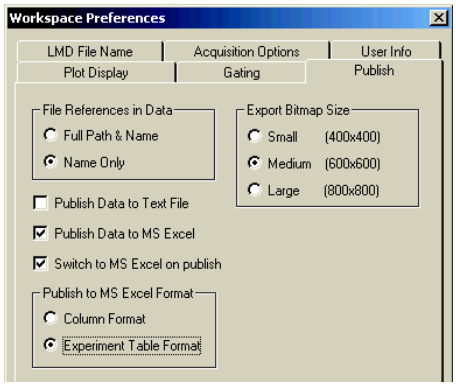
5 Click the **Acquisition Options** tab.

Click **Publish**.

Note: This step only applies if you are using one of the Analysis Add-Ins to export data files to Excel during acquisition.



6 the **Publish** tab.



7 **Publish Data to MS Excel**.

8 **Experiment Table Format**.

9 **Switch to MS Excel on publish** box (Optional). If this option is chosen, the system displays the Excel spreadsheet after each sample is run during acquisition.

10 Only files using the same protocol should be sent to Excel when using either of the Analysis Add-Ins:

- For creation of Excel files during data acquisition, assign the same protocol to all wells of a sample plate. This is done in the MXP Plate Wizard.
- For LMD Playback Tool, you must select the same protocol to analyze all of the files.
- For AutoMATOR or an open LMD file on your desktop, only one protocol applies automatically.

11 Select **Analysis ▸▸ Select Results**.

12 You must select FCS Keywords [@SampleID1] through [@SampleID4].

Only select the statistics required for data reduction.

Note: No matter how many statistics you select at this screen, only these nine statistics are used for data analysis and graphing by either of the Analysis Add-Ins:

Cell/µL

Number

% Gated

X-Mean

Y-Mean

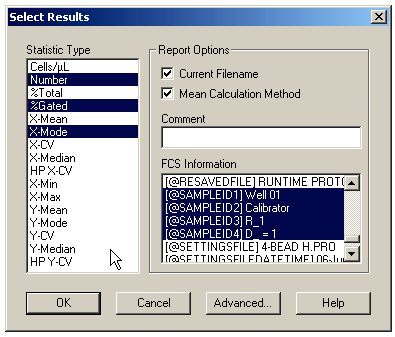
X-Mode

Y-Mode

X-Median

Y-Median.

Note: Proceed to step 19 unless you are setting up to send files during data acquisition.

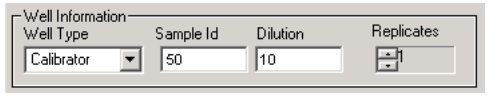


13 If calibrators are included in your assay setup, then for each calibrator:

a. Assign Calibrator as the **Well Type**.

b. In **Sample Id**, enter the actual concentration/µL of the standard.

c. Enter the **Dilution** factor as appropriate.



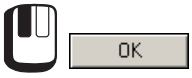
14 After you define and save the plate definition at the Plate Wizard,  to start acquisition.

15 Do not edit Sample ID 2, 3 or 4 in the Worklist when using either of the Analysis Add-Ins.

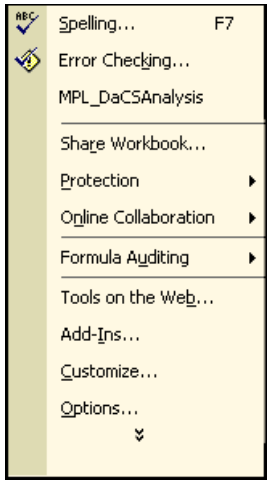
16 MS Excel automatically opens during data acquisition of the sample plate.

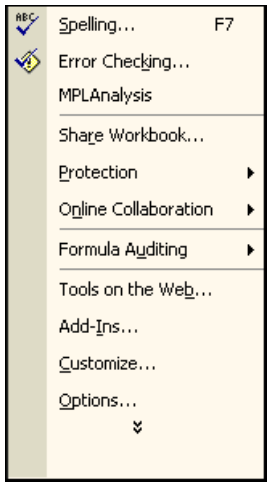
17 During acquisition, do not modify the protocol, including region or gate adjustments, or the data might be divided into multiple sheets.

18 If you have the 21 CFR Part 11 option and the spreadsheet is under DaCS software control: when the data acquisition is done, go to the Excel software and save the spreadsheet generated :

-  **DaCS ▸▸ Save Workbook**.
-  .

19 Select **Tools** ▸▸ MPL_DaCSAnalysis or **Tools** ▸▸ MPLAnalysis, as needed.



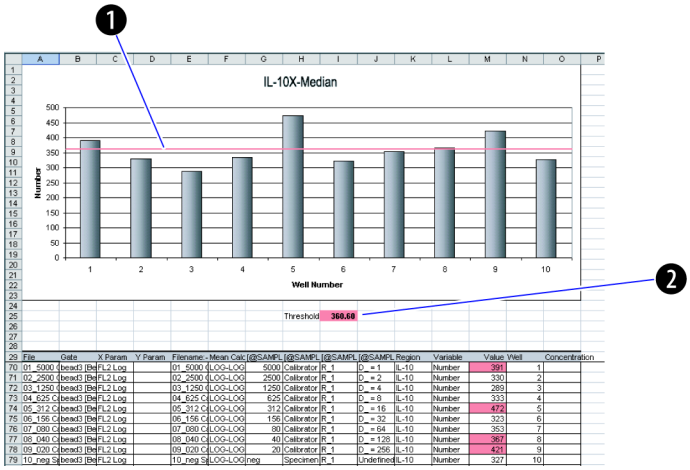


20 A screen message prompts you to open the workbook file.

Use the Browse box that appears to select the *.xls file.

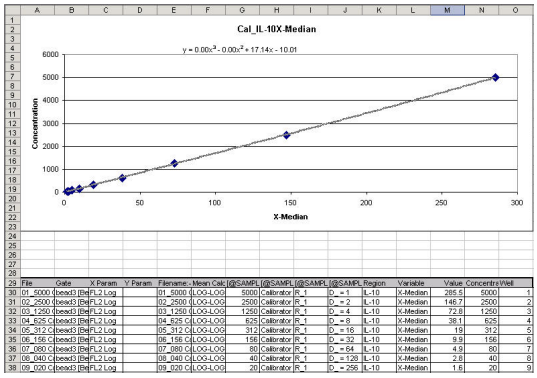
21 Review the graphs and data columns for the sample plate. Values above the threshold value ❷ appear red in the data columns and a corresponding red threshold line ❶ appears on the graph. You can modify the threshold value.

Note: Each sheet name is made up of the region name followed by the statistic name.



22 If calibrators were run:

- Separate sheets are created for each Mean, Median or Mode statistic exported.
- The calibration curve is a third order polynomial fit. It is used to determine the concentration equivalent values for the remaining Mean, Median and Mode sheets.
- A separate column is added to the remaining Mean, Median and Mode sheets with the calculated concentration equivalents for sample wells with their Well Type designated as **Specimen** in the Plate Wizard.



23 Save the graphs and data spreadsheet:

-  the selections appropriate to the Analysis Add-In used.
  - For the MPL_DaCSAnalysis Add-In, use **DaCS ▸▸ Save Workbook**.
  - For the MPLAnalysis Add-In, use **File ▸▸ Save As**.)
- Enter a new (or the same) *.xls file name.
-  .

Open Listmode File

Use the open listmode feature to open a new listmode file into all plots. Before any analysis can be done, a listmode file must be read into MXP software. Most buttons on the Button Bar are disabled until this has been done.

Use the appropriate procedure depending upon whether you have the standard MXP software or also have the 21 CFR Part 11 option installed. Select the appropriate link:

- Open Listmode File Procedure - With 21 CFR Part 11 Option Installed
- Open Listmode File Procedure - Standard MXP Software Installed

Open Listmode File Procedure - With 21 CFR Part 11 Option Installed

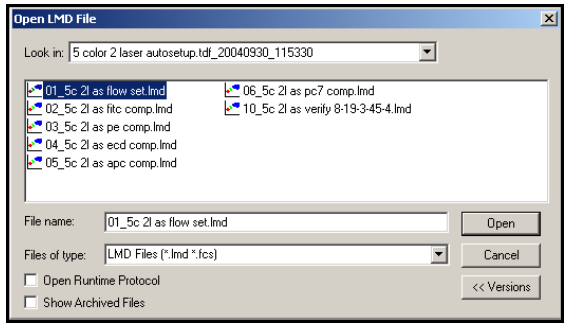
Use this procedure if you have the 21 CFR Part 11 option installed on your system.

Ask your System Administrator to restore any archived files that you need to access before proceeding. Only the System Administrator can archive files and restore archived files.

To open a listmode file for the first time:

1  **File ▸▸ Open Listmode File**.

2 Select the desired listmode file.



- **Show Archived Files** if you want to display archived files in addition to the current listmode files. appears next to each archived file name.
- the desired directory in the **Look in:** list box. (The Trays directory has *.tdf files which contain multiple *.LMD files.)
- the type of file in the **Files of type**: list box.
- the name of the listmode file you want to view.

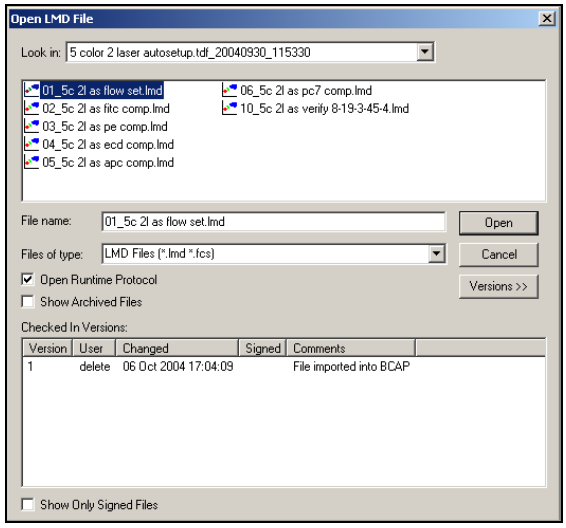
3 **Open Runtime Protocol** to replay the LMD into the plots in the runtime protocol. If the open runtime protocol is not selected, the LMD replays into the plots currently displayed on the workspace.

Note: Listmode replay uses the runtime protocol Cal Factor unless you select a different Cal Factor on the Absolute Count Calibration dialog box.

4 << Versions to display all of the versions of the selected file.

Note: This step is optional. Unless you specify a specific version, the system opens the most recent version of the file you select.

5 **Show Only Signed Files** if you only want to view files that have at least one signed version.



6 Highlight a file and all of its versions appear below.

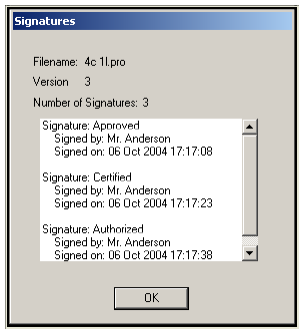
Note: Only the signed versions of the file appear if you selected **Show Only Signed Files**.

7 If **Yes Click here** appears in the **Signed** field of a version, you can

Yes Click here to view the signature information for that version.



OK after you review the signatures.



8 At any time, you can Versions >> to hide the **Checked In Versions** portion of the screen.

9 To open the file you want, highlight the file name and either:

-  

to open the most recent version of the selected file,

  OR

- Highlight a specific version of the file and  

to open that version.

Note: If you selected an archived file that has not been restored, a message appears stating the archive location of the file. Supply the file location to your System Administrator and request the file be restored.

When loading listmode files which have a parameter order different from the current protocol, you are warned with *Parameter Mismatch*.

- If you select **Continue**, the file is loaded and replaces the parameters with those of the listmode file.
- If you select **Abort**, the listmode file is not loaded.

Note: Listmode Compensation must be performed using the runtime protocol or a protocol with equivalent parameters as the runtime protocol.

When loading listmode files from a different instrument *This is not an FC 500 file* appears. Select **Continue** to load the file.

Open Listmode File Procedure - Standard MXP Software Installed

Use this option to open a new listmode file into all plots if you have the standard MXP software installed (without the 21 CFR Part 11 option). In Analysis software, this option updates all Plots relevant to one particular sample.

Before any analysis can be done, a listmode file must be read into MXP software. Most buttons on the Button Bar are disabled until this has been done.

To open a listmode file for the first time:

---

1 **File ▸▸ Open Listmode File**.

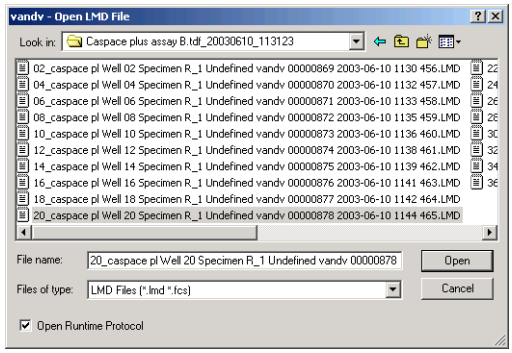
---

2 Select the desired listmode file.

a. the desired directory in the **Look in:** list box. (The Trays directory has *.tdf files which contain multiple *.LMD files.)

b. the type of file in the **Files of type**: list box.

c. the name of the listmode file you want to view.



---

3 **Open Runtime Protocol** to replay the LMD into the plots in the runtime protocol. If the open runtime protocol is not selected, the LMD replays into the plots currently displayed on the workspace.

Note: Listmode replay uses the runtime protocol Cal Factor unless you select a different Cal Factor on the Absolute Count Calibration dialog box.

When loading listmode files which have a parameter order different from the current protocol, you are warned with *Parameter Mismatch*.

- If you select **Continue**, the file is loaded and replaces the parameters with those of the listmode file.
- If you select **Abort**, the listmode file is not loaded.

Note: Listmode Compensation must be performed using the runtime protocol or a protocol with equivalent parameters as the runtime protocol.

When loading listmode files from a different instrument *This is not an FC 500 file* appears. Select **Continue** to load the file.

Save Listmode File As

Use this Save As feature if at any time you decide to save your listmode file under a different File Name.

Use the appropriate procedure depending upon whether you have the standard MXP software or also have the 21 CFR Part 11 option installed. Select the appropriate link:

- Save Listmode File As Procedure - With 21 CFR Part 11 Option Installed
- Save Listmode File As Procedure - Standard MXP Software Installed

Save Listmode File As Procedure - With 21 CFR Part 11 Option Installed

Use this procedure if you have the 21 CFR Part 11 option installed on your system.

---

1 **File ▸▸ Save Listmode File As**.

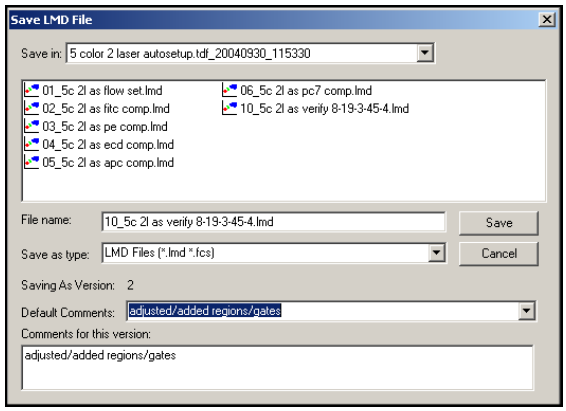
---

2 Specify the name of the file.

a. the desired directory in the **Save in:** list box.

b. the type of file in the **Save as type:** list box.

c. In the **File name** text box, type the desired File Name.



---

3 You must enter a comment before you can save a new version:

- Select an appropriate comment from the list of **Default Comments**,

  OR

- Type in a comment in the **Comments for this version** field.

Note: Once a comment is entered, the version number automatically appears in the **Saving As Version** field and the Save button is active.

---

4 Save to save the file.

MXP software creates a file with the name (and with the version and comment, if applicable) that you specified and stores it in the drive and directory you specified in FCS format.

File Name

A listmode file name can have up to 200 alphanumeric characters, including the filepath. However, the following characters cannot be included: forward slash (/), backslash (\), greater than sign (>), less than sign (<), asterisk (*), comma (,), question mark (?), quotation mark ("), pipe symbol (|), colon (:), or apostrophe ('). Leading, Trailing and multiple spaces are not allowed.

Save Listmode File As Procedure - Standard MXP Software Installed

Use this procedure if you have the standard MXP software installed (without the 21 CFR Part 11 option). Use this Save As feature if at any time you decide to save your listmode file under a different File Name:

---

1 **File ▸▸ Save Listmode File As**.

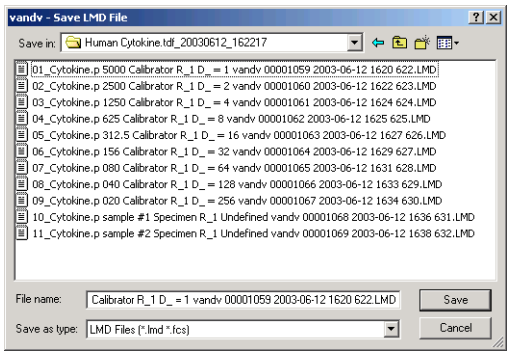
---

2 Specify the name of the file.

a. the desired directory in the **Save in:** list box.

b. the type of file in the **Save as type:** list box.

c. In the **File name** text box, type the desired File Name.



---

3 Save to save the file.

MXP software creates a file with the name that you specified and stores it in the drive and directory you specified in FCS format.

File Name

A listmode file name can have up to 200 alphanumeric characters, including the filepath. However, the following characters cannot be included: forward slash (/), backslash (\), greater than sign (>), less than sign (<), asterisk (*), comma (,), question mark (?), quotation mark ("), pipe symbol (|), colon (:), or apostrophe ('). Leading, Trailing and multiple spaces are not allowed.

Open Histogram

This feature is not available in MXP software.

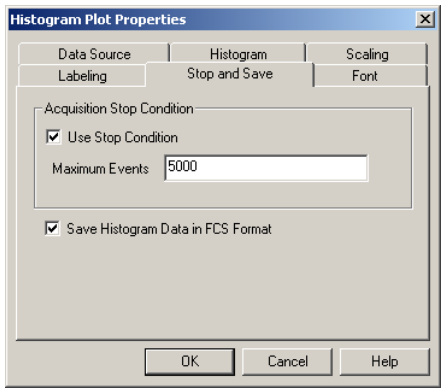
Save All FCS Format Files

This option saves the current listmode file to disk and saves any histograms marked for saving.

---

1 Highlight the required plot.

Note: The individual Histogram's Plot Properties must be set to save.



---

2 **Plots ▸▸ Acquisition Stop & Save** menu option.

---

3 **Save Histogram Data In FCS Format**.

Note: An (S) is added to the plot title if you select this option. Do not confuse this with an [S] that identifies a gate.

---

4 Repeat for each plot you wish to be saved.

---

5 **File ▸▸ Save All FCS Format Files.**

Save Histogram File As

The **Save Histogram File As** feature allows a single histogram associated with the currently in-focus plot to be saved directly to an FCS histogram file. Use the appropriate procedure depending upon whether you have the standard MXP software or also have the 21 CFR Part 11 option installed. Select the appropriate link:

- Save Histogram File As Procedure - With the 21 CFR Part 11 Option Installed
- Save Histogram File As Procedure - Standard MXP Software Installed

Note: MXP software only saves one Histogram Plot in a single FCS histogram file.

Save Histogram File As Procedure - With the 21 CFR Part 11 Option Installed

1 Highlight the Histogram Plot (Current window).

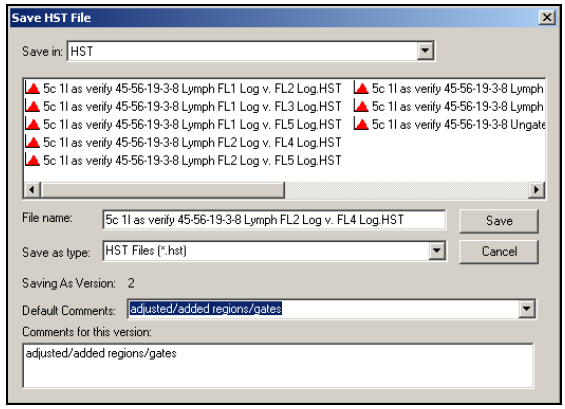
2 **File ▸▸ Save Histogram File As**.

3 Specify the name of the file.

a. the desired directory in the **Save in:** list box.

b. the type of file in the **Save as type:** list box.

c. In the **File name** text box, type the desired File Name.



4 You must enter a comment before you can save a new version:

- Select an appropriate comment from the list of **Default Comments**,

  OR

- Type in a comment in the **Comments for this version** field.

Note: Once a comment is entered, the version number automatically appears in the **Saving As Version** field and the Save button is active.

5 Save to save the file.

MXP software creates a file with the name (and with the version and comment, if applicable) that you specified and stores it in the drive and directory you specified in FCS histogram format.

Save Histogram File As Procedure - Standard MXP Software Installed

Use this procedure if you have the standard MXP software installed (without the 21 CFR Part 11 option).

1 Highlight the Histogram Plot (Current window).

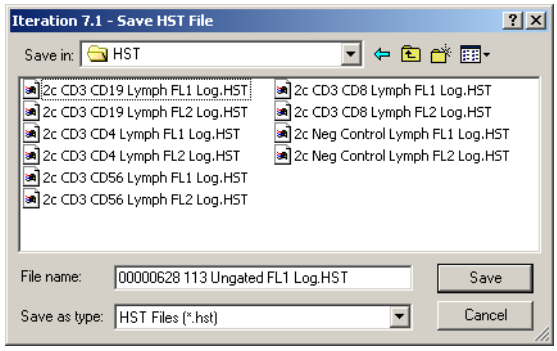
2 **File ▸▸ Save Histogram File As**.

3 Specify the name of the file.

a. the desired directory in the **Save in:** list box.

b. the type of file in the **Save as type:** list box.

c. In the **File name** text box, type the desired File Name.



4 Save to save the file.

MXP software creates a file with the name that you specified and stores it in the drive and directory you specified in FCS histogram format.

Open Protocol

Use this feature to open a protocol file. Use the appropriate procedure depending upon whether you have the standard MXP software or also have the 21 CFR Part 11 option installed. Select the appropriate link:

- Open Protocol Procedure - With the 21 CFR Part 11 Option Installed
- Open Protocol Procedure - Standard MXP Software Installed

Open Protocol Procedure - With the 21 CFR Part 11 Option Installed

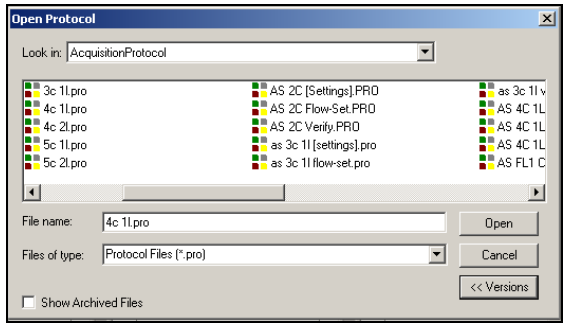
Use this procedure if you have the 21 CFR Part 11 option installed on your system. Ask your System Administrator to restore any archived files that you need to access before proceeding. Only the System Administrator can archive files and restore archived files.

---

1 **File ▸▸ Open Protocol**.

---

2 Select the desired protocol file.



- **Show Archived Files** if you want to display archived files in addition to the current protocol files. appears next to each archived file name.
- the desired directory in the **Look in:** list box.
- the type of file in the **Files of type**: list box.
- the name of the protocol file you want to view.

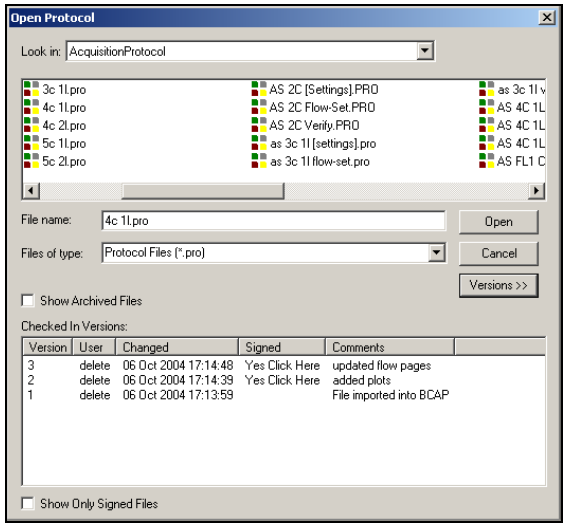
3 << Versions to display all of the versions of the selected file.

Note: This step is optional. Unless you specify a specific version, the system opens the most recent version of the file you select.

4 **Show Only Signed Files** if you only want to view files that have at least one signed version.

5 Highlight a file and all of its versions appear below.

Note: Only the signed versions of the file appear if you selected **Show Only Signed Files**.

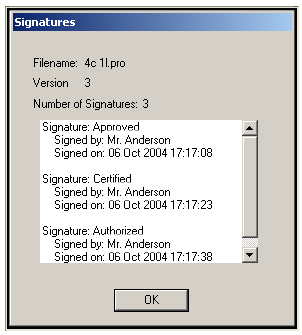


6 If **Yes Click here** appears in the **Signed** field of a version, you can

Yes Click here to view the signature information for that version.

OK after you review the signatures.





7 At any time, you can 

to hide the **Checked In Versions** portion of the screen.

8 To open the file you want, highlight the file name and either:

- 

to open the most recent version of the selected file,

  OR

- Highlight a specific version of the file at the bottom of the screen and

to open that version.

Note: Double clicking with the mouse on the file name or version closes the dialog box and opens the file.

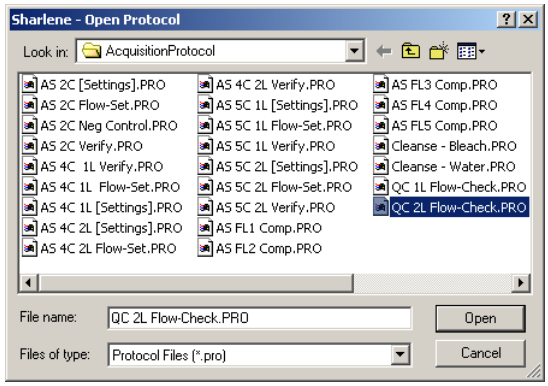
Note: If you selected an archived file that has not been restored, a message appears stating the archive location of the file. Supply the file location to your System Administrator and request the file be restored.

Open Protocol Procedure - Standard MXP Software Installed

Use this procedure if you have the standard MXP software installed (without the 21 CFR Part 11 option).

1 **File ▸▸ Open Protocol**.

The Open Protocol File dialog box appears.



2 the file you wish to open from the Folders list box.

3 Open.

Note: Double clicking with the mouse on the file name closes the dialog box and opens the file.

Save Protocol

Save Protocol Feature - With the 21 CFR Part 11 Option Installed

If your system has the 21 CFR Part 11 option installed, using the **Save Protocol** button performs differently depending upon whether or not acquisition is in process:

- If Acquisition is NOT in process, the Save Protocol button works the same as the Save Protocol As Procedure - With the 21 CFR Part 11 Option Installed.
- If Acquisition is in process, the Save Protocol button automatically saves a new version of the protocol with a Save Comment that states this was a system generated save.

Ctrl+S is the shortcut option, as is the **Save Protocol** button.

Note: While acquiring a Worklist, avoid selecting **Save Protocol** when the system is transitioning to the next tube in the Worklist.

Note: If you open protocols from other Users' folders and you want to save the protocols to your folder, you must use the Save Protocol As Procedure - With the 21 CFR Part 11 Option Installed feature and navigate to your folder and save the protocol.

Save Protocol Procedure - Standard MXP Software Installed

Selecting this feature saves the Protocol in its current form. Ctrl+S is the shortcut option, as is the **Save Protocol** button.

Note: If you open protocols from other Users' folders and you want to save the protocols to your folder, you must use the Save Protocol As Procedure - Standard MXP Software Installed feature and navigate to your folder and save the protocol.

Save Protocol As

Use this feature to save a protocol file under a different name or to a different folder. Use the appropriate procedure depending upon whether you have the standard MXP software or also have the 21 CFR Part 11 option installed. Select the appropriate link:

- Save Protocol As Procedure - With the 21 CFR Part 11 Option Installed
- Save Protocol As Procedure - Standard MXP Software Installed

Save Protocol As Procedure - With the 21 CFR Part 11 Option Installed

Use this procedure if you have the 21 CFR Part 11 option installed on your system.

---

1 **File ▸▸ Save Protocol As**.

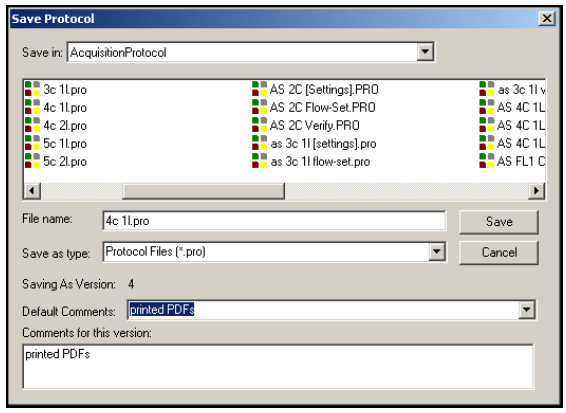
---

2 Specify the name of the file.

a. the desired directory in the **Save in:** list box.

b. the type of file in the **Save as type:** list box.

c. In the **File name** text box, type the desired File Name.



3 You must enter a comment before you can save a new version:

- Select an appropriate comment from the list of **Default Comments**,

  OR

- Type in a comment in the **Comments for this version** field.

Note: Once a comment is entered, the version number automatically appears in the **Saving As Version** field and the Save button is active.

4 Save to save the file.

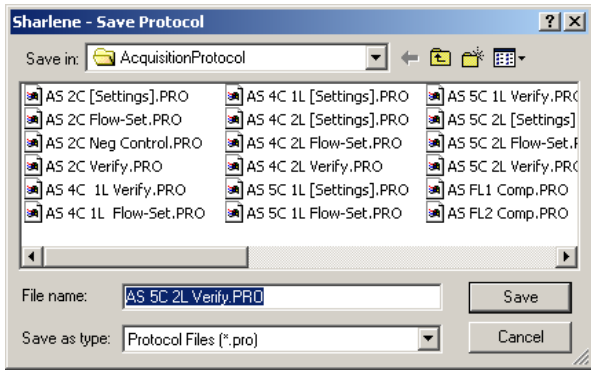
MXP software creates a file with the name (and with the version and comment, if applicable) that you specified and stores it in the drive and directory you specified in FCS format.

MXP software gives the default file extension *.PRO. The *.PRO extension is only a suggested extension, any standard DOS characters can be used for the full File Name. You are urged to keep the extension consistent for easy file searches.

Save Protocol As Procedure - Standard MXP Software Installed

Use this procedure if you have the standard MXP software installed (without the 21 CFR Part 11 option).

1 **File ▸▸ Save Protocol As**.



2 In the Save Protocol As dialog box,

the desired folder from the list or by typing the path in the **File name** text box.

3 In the **File name** text box, type the desired File Name.

MXP software gives the default file extension *.PRO. The *.PRO extension is only a suggested extension, any standard DOS characters can be used for the full File Name. You are urged to keep the extension consistent for easy file searches.

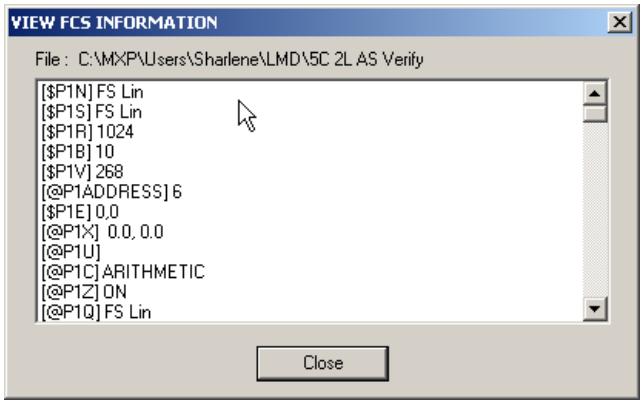
Save Listmode Compensation As

Use this feature to save the currently loaded compensation settings into a *.CMP file. These compensation files are most often used with the Listmode playback feature.

View FCS Header Information

File ▸▸ View FCS Header Information to view the FCS header information on the current file.

Note: The Amplifier Gain field is no longer available at this screen if you adjusted the compensation of a Listmode file using the LMD QuickCOMP tool. The original stored file remains unchanged and contains the Amplifier Gain information.



FCS Keywords Used in MXP Software

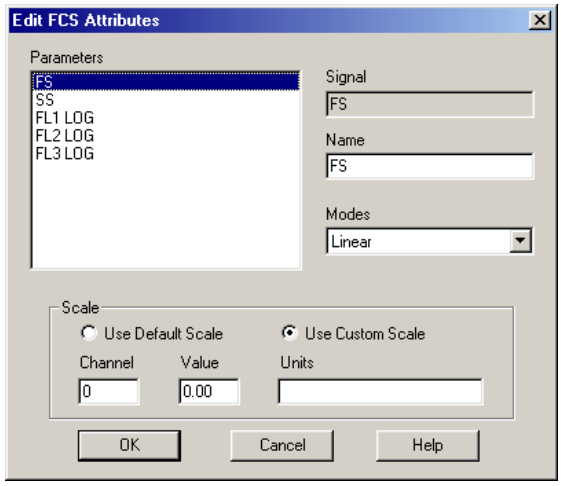
See FCS Header - Keyword Reference.

Edit FCS Header Attributes

Use this option to edit the FCS header information, including calibration information. You can change the displayed name of Parameters or change the scaling options. Axis calibration information can be entered here. This information is embedded in the listmode file. See Default Log Scaling for setting the default log tick marks.

---

1 **File ▸▸ Edit FCS Attributes** to view the Edit FCS Header Attributes dialog box.



---

2 Make the desired changes.

---

3 OK or press Enter to accept.

---

4 Cancel or press Esc to exit the dialog box without saving the changes.

These changes may also be saved permanently within the open protocol by **File ▸▸ Save Protocol** or **File ▸▸ Save Protocol As**.

Note: Modifying the scale options should not be done during acquisition. Replaying of the listmode files always uses the calibration set at acquisition.

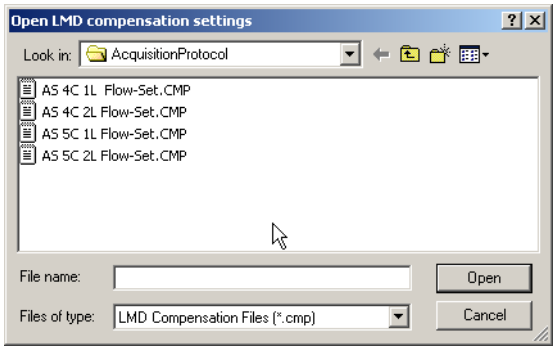
Import

Settings From CMP File

This option allows compensation settings obtained from the Listmode Playback option to be imported into the current protocol.

---

1 **File ▸▸ Import ▸▸ Settings from CMP File.**



---

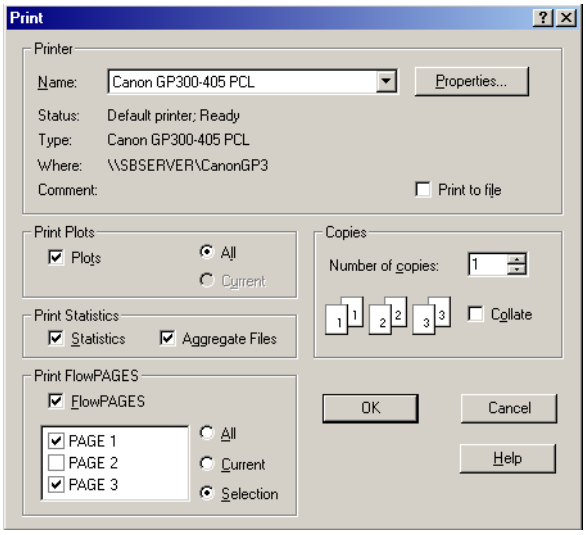
2 the appropriate file and Open.

The compensation settings from the stored file are then read into the current MXP software protocol.

Print

You can print plots and statistics in a variety of ways.

1 **File ▸▸ Print**. The Print dialog box is displayed.



2 Make the desired changes.

3 OK or press Enter to commence printing.

See also:
Print Plots
Print Statistics
Print FlowPAGEs

4 Cancel or press Esc to exit the dialog box without saving the changes.

Print Plots

Select this option if you wish to Print Plots. Choose ALL or CURRENT Plots.

Print Statistics

- Statistics
  Select this option if you wish to Print Statistics.
- Aggregate Files
  This option groups together statistics from all the regions on a single file. Otherwise statistics are printed grouped by plot.

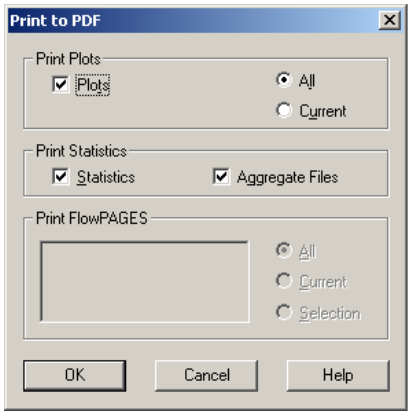
Print FlowPAGEs

Select this option to print FlowPAGEs. Choose ALL, CURRENT or a SELECTION.

To print individual pages, you can enable the page number checkbox.

Print to PDF

Print plots, statistics or FlowPAGES in PDF format.



Note: During installation an ACSPDF printer driver is added to the Windows Printers folder. This driver is used for the **Print To PDF** options only. If you require additional functionality to create PDF reports, you need to use a full version of Adobe® Acrobat® software. This additional software is not included with MXP Software.

If you install Adobe Acrobat 4.0 or higher you should use the Adobe distiller to create PDF files rather than the ACSPDF - PDF compatible print driver. If you continue to use the **Print to PDF** options within MXP Software when Adobe Acrobat 4.0 or higher is installed, some Flowpages are cropped. This issue does not occur when Acrobat Reader® only is installed.

Workspace Preferences - Introduction

Use Workspace Preferences option to set the defaults for the workspace and plot options according to your own preference. Some of the options are global, so they immediately apply the specific changes required to all plots. Other options only apply the changes to the plots created after the option has been selected. Use **Plots ▸▸ Format Plot** to modify the Default Plot options on a per plot basis.

See also:
Workspace Preferences - Gating
Workspace Preferences - Publish
Workspace Preferences - Plot Display
Workspace Preferences - LMD File Name
Workspace Preferences - User Info
Workspace Preferences - Acquisition Options

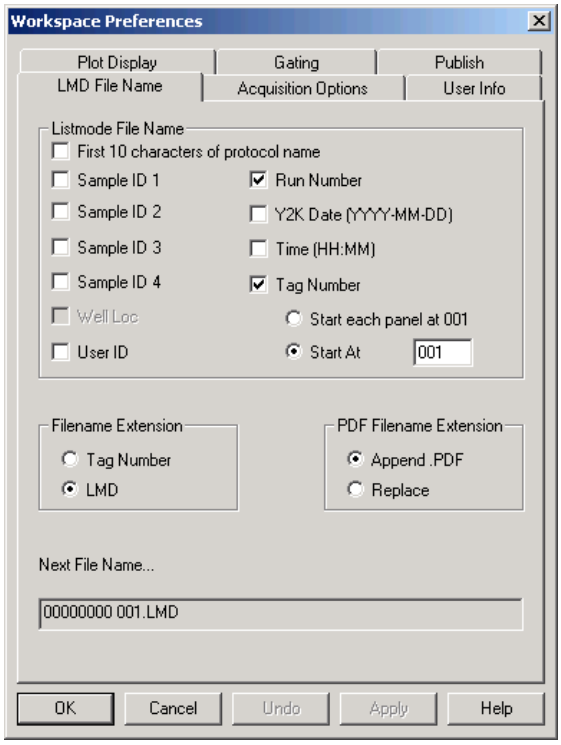
Workspace Preferences - LMD File Name

This tab allows you to specify a compound listmode file name, including components such as the date and the time that the sample was run as well as sample ID fields.

The File Name displayed in Acquisition Manager is only a provisional file name. Some available options (for example: Run Number and Time) can only be defined at the time of acquisition. If a printout of the Worklist is required with the final assigned file name it is only correct once acquisition of samples is complete. Well Loc is not available. The well number is automatically added to the start of the file name for easy identification.

A file name can have up to 200 alphanumeric characters, including the path. However, the following characters cannot be included: forward slash (/), backslash (\), greater than sign (>), less than sign (<), asterisk (*), comma (,), question mark (?), quotation mark ("), pipe symbol (|), colon (:), or apostrophe (‘). Leading, trailing and multiple spaces are not allowed.

First 10 characters....
Sample ID 1, 2, 3, 4
Well Loc
User ID
Run Number
Y2K Date
Time
Tag Number
File Name Extension
PDF File Name Extension
Next File Name



Note: If more than one Listmode File Name is selected, the priority of the options used for the file name are:

1. Well Loc
2. Sample ID 1
3. Protocol ID
4. Sample ID 2
5. Sample ID 3
6. Sample ID 4
7. Run Number
8. Tag Number
9. User ID
10. Date
11. Time

See also:
Workspace Preferences - Introduction
Workspace Preferences - Acquisition Options
Workspace Preferences - User Info
Workspace Preferences - Plot Display
Workspace Preferences - Gating
Workspace Preferences - Publish

First 10 characters….

The first ten characters of the protocol filename are used to generate the listmode filename for acquisition. If the protocol name is longer, then the name is truncated to 10 characters.

Sample ID 1, 2, 3, 4

The Sample ID columns allow you to enter information about the particular sample being run. When this box is checked in Workspace Preferences, the information in any of these columns is included as part of the listmode file name. Each Sample ID column corresponds to information entered in the Plate Wizard about the Sample Id, Well Type, Replicates, and Dilution.

Note: Be sure to verify manually entered sample IDs.

Well Loc

This option is not available.

User ID

When checked, this includes the User ID as part of the listmode file name.

Run Number

The system automatically generates an incrementing run number every time that a sample is run. When this option is selected, the run number is included as part of the listmode file name – The easiest way to ensure unique file names are always generated. If not selected, the run number is still generated, saved and can be accessed in the FCS Header section of the file.

Y2K Date

When selected, this option includes the date as part of the listmode file name. The format used is the standard Year 2000 format (YYYY-MM-DD), showing when the sample was analyzed.

Time

When this option is selected, the time (HH-MM-SS) that the sample was analyzed is included as part of the listmode file name.

Note: The Listmode File Name column displays only a provisional file name prior to acquisition. If Time or Run Number is included as part of the name the actual value of these fields can only be determined once acquisition of each sample is complete. Therefore, if you wish to print a worklist including the final listmode file names, only do so once acquisition of all samples in the Worklist is complete.

Tag Number

This allows you to choose whether the Tag number should be included as part of the listmode file name. If this option is selected, it activates the following items:

- Start each Panel at 001
  This starts the Tag Numbering option from 001 for each new panel.
- Start At
  This starts the Tag Numbering option from any number that you require, and continues incrementing until manually reset.

File Name Extension

This sets the file extension to be either Tag Number or LMD:

- Tag Number
  Selecting this option allows you to have the Tag Number as the file name extension. This is dependent on a Tag Number being previously selected.
- LMD
  This option sets the file name extension to be LMD.

PDF File Name Extension

Change the LMD File Name extension to one of the options listed below.

Append .PDF File Name

Append PDF to the listmode file name extension.

Replace

Replace the current listmode file name extension with .PDF. This option should only be used when LMD is being used as the listmode file name extension.

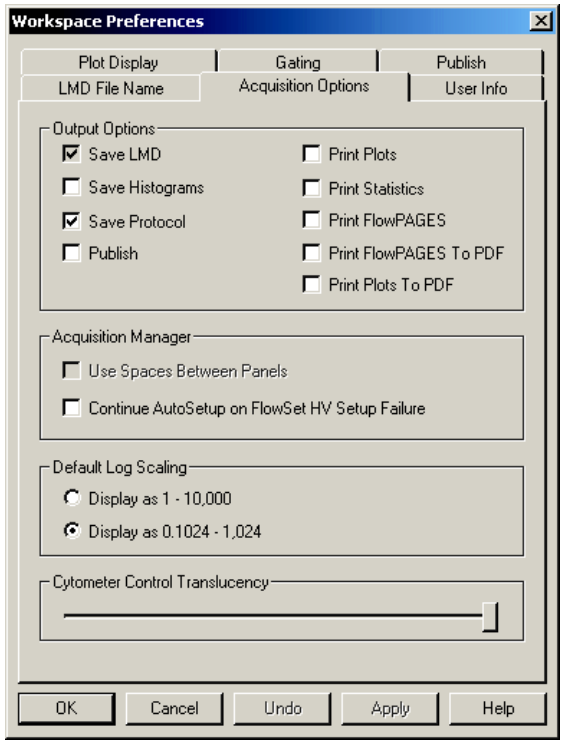
Next File Name

Displays the next listmode file name. Once assigned in the Plate Wizard, the well number of the sample is added to the front of this file name.

Workspace Preferences - Acquisition Options

Sets the default Acquisition Options for MXP software during Acquisition, allowing automatic Saving, Printing and Exporting of Data.

Output Options
Acquisition Manager
Default Log Scaling
Cytometer Control Translucency



See also:
Workspace Preferences - Introduction
Workspace Preferences - LMD File Name
Workspace Preferences - User Info
Workspace Preferences - Plot Display
Workspace Preferences - Gating
Workspace Preferences - Publish

Output Options

The Output actions occur automatically at the completion of the acquisition of each sample. Check the appropriate options for the actions you wish to perform when acquiring data using the Acquisition Manager. See also, Workspace Preferences - Publish.

When you select Publish and data is exported to MS Excel, the workbook file name consists of the Plate ID and a date/time stamp. The file is saved to the user's Results directory. The number of worksheets produced depends on the number of protocols used in the worklist and whether you selected Column Format or Experiment Table Format on the Workspace Preferences Publish page.

Note: Save Protocol applies to any changes made to a protocol, whether acquiring or not. You cannot alter the Save LMD default, as this is a mandatory setting. If a protocol name begins with Cleanse, the protocol does not create a listmode file when the protocol is run.

If you have the 21 CFR Part 11 Option installed on your system and Save Protocol is selected, a new version is created and saved at the end of acquisition for any protocol that was run. A comment is saved with that file version stating it was system generated. Automatic versioning also applies to the protocols and Instrument Settings files in the AutoSetup panel.

Acquisition Manager

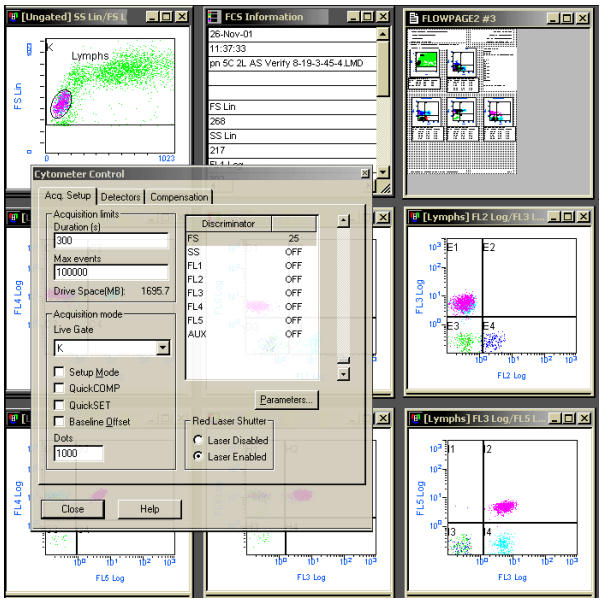
- Use Spaces Between Panels - Not available for MXP software.
- Continue AutoSetup on FlowSet HV Setup Failure - Eliminates the manual approval step in AutoSetup Wizard when running Flow-Set fluorospheres.

Default Log Scaling

Sets the default logarithmic scaling (tick marks) to be 0.1024 –1,024 or 1 - 10,000.

Cytometer Control Translucency

Use this slider to fade the Cytometer Controls dialog so it appears translucent.

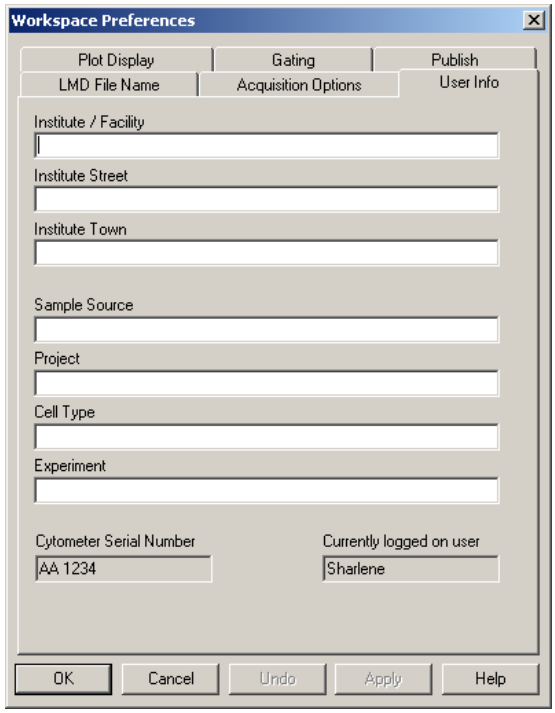


Workspace Preferences - User Info

When selected, this option allows defined information and sample/project information to be stored as part of the FCS header in listmode files. This can be printed out as required via the Legend plot or with the exported data.

All of these are optional and can be filled in according to your preference.

Institute
Institute Street
Institute Town
Sample Source
Project
Cell Type
Experiment
Cytometer Serial Number
Currently Logged On User



See also:
Workspace Preferences - Introduction
Workspace Preferences - LMD File Name
Workspace Preferences - Acquisition Options
Workspace Preferences - Plot Display
Workspace Preferences - Gating
Workspace Preferences - Publish

Institute

Enter the Institute name with a minumum of 3 characters. It can be printed out as part of the statistics output.

Institute Street

Enter the Institute street address. It can be printed out as part of the statistics output.

Institute Town

Enter the Institute town. It can be printed out as part of the statistics output.

Sample Source

This option allows you to enter information regarding where the sample came from.

Project
The name for the project is entered here.

Cell Type
This labels the sample with the specific cell type being analyzed in that sample.

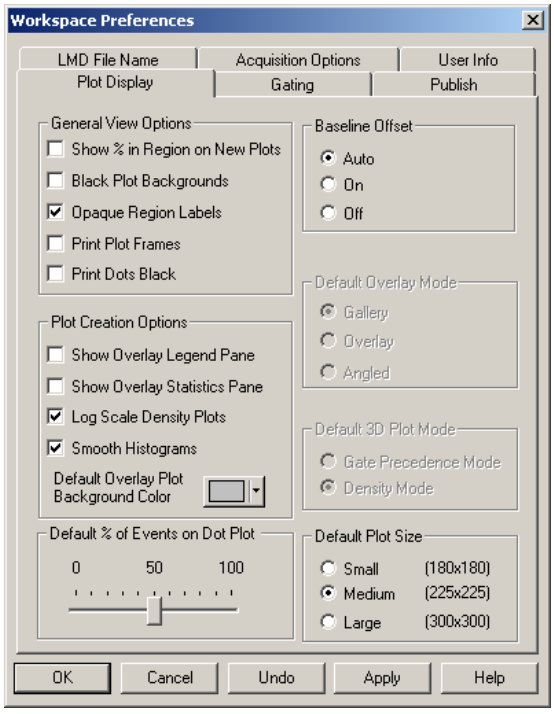
Experiment
The name of the experiment being conducted is entered into this section.

Cytometer Serial Number
The serial number from the specific Cytometer being used is displayed here and recorded in the listmode file, as more than one Cytometer may be utilized in the same experiment. You must be logged on as Administrator to enter the serial number.

Currently Logged On User
The User ID of the currently logged on user is displayed here and recorded in the listmode file.

Workspace Preferences - Plot Display

Show % in Region
Black Plot Backgrounds
Opaque Region Labels
Print Plot Frames
Print Dots Black
Show Overlay Legend Pane
Show Overlay Statistics Pane
Log Scale Density Plots
Smooth Histograms
Default Overlay Plot Background Color
Default % of Events on Dot Plot
Baseline Offset
Default Overlay Mode
Default 3D Plot Mode
Default Plot Size



See also:
Workspace Preferences - Introduction
Workspace Preferences - LMD File Name
Workspace Preferences - Acquisition Options
Workspace Preferences - User Info
Workspace Preferences - Gating
Workspace Preferences - Publish

Show % in Region

When selected, this automatically displays the percentage of events in a particular region. All regions that have been created display this percentage.

Black Plot Backgrounds

This displays the plots with a black background instead of white. This can be useful as it makes the viewing of smaller populations of cells much easier. When you print, drag or copy a plot to other software programs the background remains white.

Opaque Region Labels

When black backgrounds are chosen, the region labels are not visible since the text color is not automatically inverted. This option displays an area around the annotation within black backgrounds, making it visible.

Print Plot Frames

This option can be used to show or hide frames on plots printed directly from the File Print menu and exported plot images.

If this is checked, all frames are displayed around plots. If it is clear, frames are not printed or exported.

Print Dots Black

Select this option to print all dots in black irrespective of their colors. If it is clear, dots are printed in various shades of gray or, if using a color Printer, the best matched colors available. This option does not affect the printing of FlowPAGEs.

Show Overlay Legend Pane

This feature is not available in MXP software.

Show Overlay Statistics Pane

This feature is not available in MXP software.

Log Scale Density Plots

Selecting this option displays any plot with a density mode (for example, density plot) with log scaling of the density levels. If unchecked, linear scaling of the density levels is used. These changes are only applied to plots created after this option has been selected, and not to the ones previously created.

Smooth Histograms

This automatically smooths single histograms by default allowing for easier viewing. When selected, this option displays smoothed data on all new histograms as they are created. It does not apply any of the changes to previously created plots.

Note: If peaks observed during acquisition in a single parameter histogram disappear when the stop count is reached, remove the check from the **Smooth** checkbox. This condition occurs due to a small number of events in this plot.

Default Overlay Plot Background Color

This feature is not available in MXP software.

Default % of Events on Dot Plot

This allows you to set the default number of dots to be displayed when creating a dot plot. These changes are only applied to plots created after this option has been selected, and not to the ones previously created. Reducing the default percentage increases the speed of software functions when reading large listmode files.

Baseline Offset

IMPORTANT Risk of erroneous results. The Baseline Offset function should only be used after first viewing data with the baseline offset function turned Off (unchecked). You must be satisfied that the overall results of an assay are not significantly affected by turning baseline offset on. If the lower marker of a statistics region is higher than the first decade (of log displayed data) then there should be no effect at all by using Baseline Offset on Statistics data from that region.

This function allows log data in very low level signals to be moved up from low numbered channels by adding a randomized Gaussian positive offset. This allows easier comparison of data from other Cytometers. Baseline Offset includes the following three options:

- Auto
  This option displays the listmode data according to a keyword in the FCS file header. If the Baseline Offset keyword value is ON, then data is automatically displayed with Baseline Offset switched on. If it is OFF, then data is displayed with no Baseline Offset.
- On
  This reads a file and modifies the displayed data only by adding a randomized Gaussian offset to the low-level signals. Data on disk is not modified and is left as it was when acquired from the Cytometer.
- Off
  Reads a file exactly as it is without modification during display.

Note: Changing Baseline Offset settings on the Cytometer Control dialog does not affect the currently loaded listmode file. Only changes made on the Workspace Preferences dialog affect the currently loaded listmode file. If the desired Baseline Offset option is already selected in Workspace Preferences, select another Baseline Offset option, apply, and then select the desired Baseline Offset option again.

Default Overlay Mode

This feature is not available in MXP software.

Default 3D Plot Mode

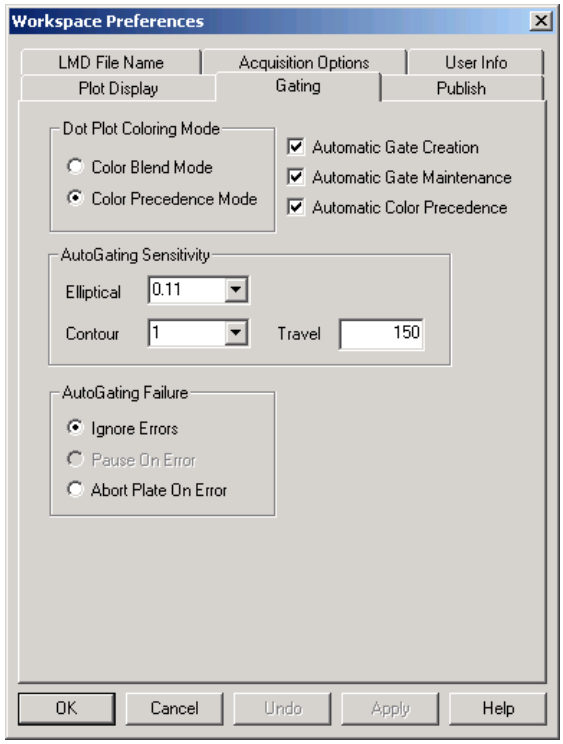
This feature is not available in MXP software.

Default Plot Size

Allows you to select the size of the plot display.

Workspace Preferences - Gating

Automatic Gate Creation
Automatic Gate Maintenance
Automatic Color Precedence
Dot Plot Coloring Mode
AutoGating Sensitivity
Elliptical Sensitivity
Contour Sensitivity
Contour Travel
AutoGating Failure
Pause on Error
Abort Plate On Error
Ignore Errors



See also:
Workspace Preferences - Introduction
Workspace Preferences - LMD File Name
Workspace Preferences - Acquisition Options
Workspace Preferences - User Info
Workspace Preferences - Plot Display
Workspace Preferences - Publish

Automatic Gate Creation

This option allows you to create a new gate automatically when a new Region is created. If this option is not selected you must use **Analysis ▸▸ Create Modify Gates** to create gating logic. Regions copied using Ctrl+Drag and Drop into a plot assign the region as a gate.

Automatic Gate Maintenance

Enabling this option ensures that when the gating of a plot changes, the associated gate of any region drawn onto this plot also changes to reflect the new gating state.

Automatic Color Precedence

As a new region is drawn, the color for that gate is placed at the top of the list in the color precedence dialog box. If this option is disabled, a color is not associated with a gate.

Dot Plot Coloring Mode

This alternates Color Dot plot mode between Color Blend and Color Precedence modes:

- Color Blend Mode
- Color Precedence Mode (default)

AutoGating Sensitivity

Select the sensitivity of the AutoGate region drawn.

Elliptical Sensitivity

Settings are 0.11, 0.33 and 1.1 (% of processed peak). Selecting 0.11 creates a larger region, whereas selecting 1.1 creates a smaller radius region around the target population.

Contour Sensitivity

Settings are 1, 2, 3, 4, and 5. Level 1 = 0.11% processed peak at a resolution of 64x64, levels 2, 3 and 4 are 0.11, 0.33 and 1.1% at a resolution of 128x128. Level 5 is 1.1% processed peak at a resolution of 256x256.

Contour Travel

Input a maximum value the contour AutoGate region travels from the mean. The Minimum value is 25; Maximum is 250 channels. Use this option to slightly adjust the AutoGate from sample to sample if slight changes in lysis cause the target population to move slightly. This option is not available for elliptical AutoGates.

AutoGating Failure

You can select an error option when the AutoGate algorithm fails during acquisition.

Pause on Error

This option is not available in MXP software.

Abort Plate On Error

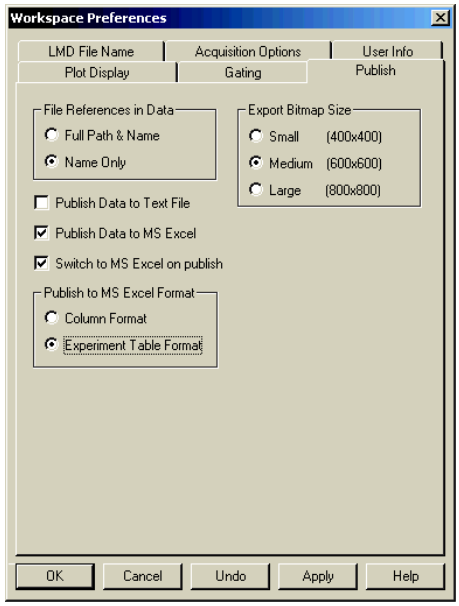
The system automatically aborts the sample plate when an AutoGating error occurs.

Ignore Errors

The system continues processing the Worklist when an AutoGating error occurs.

Workspace Preferences - Publish

File References in Data
Publish Data to Text File
Publish Data to MS Excel
Switch to MS Excel on Publish
Publish to MS Excel Format
Export Bitmap Size



See also:
Workspace Preferences - Introduction
Workspace Preferences - LMD File Name
Workspace Preferences - Acquisition Options
Workspace Preferences - User Info
Workspace Preferences - Plot Display
Workspace Preferences - Gating

File References in Data

Choose to reference the file name by Full Path and Name or by Name Only.

Publish Data to Text File

Enable this checkbox to publish data to an ASCI text file with a file extension of .TXT.

Publish Data to MS Excel

This function enables you to publish data to a Microsoft Excel Workbook, used in conjunction with the **Tools ▸▸ Publish Results Now** menu item.

The MXP software automatically creates a new workbook when data is published to Excel. You cannot overwrite or append an existing workbook. The workbook file name is saved to the User's Results directory.

If you have the 21 CFR Part 11 option: when Excel is opened, it is under the control of the DaCS software supplied with MXP software. DaCS software provides a means of compliance with Regulation 21 CFR Part 11 for data files exported to Microsoft Excel from the MXP software. The workbook is under the control of the DaCS software and audit trail information is supplied.

These Excel worksheets are random password protected and can only be modified when under DaCS software control.

Switch to MS Excel on Publish

MS Excel starts and displays the published data. When enabled, Excel moves to the front of Windows desktop as the active application with each export. If left unchecked, Excel runs in the background with each subsequent export.

Publish to MS Excel Format

Select the appropriate radio button for the format you want:

- Column Format
  - If all the tests in the worklist use the same protocol, then this format creates one worksheet containing the statistic information of all of the listmode files from the worklist.
  - If the tests in the worklist use more than one protocol, then this format creates a separate worksheet containing the statistic information for each listmode file from the worklist.
- Experiment Table Format
  - Creates one worksheet containing the statistic information of all of the listmode files from the worklist.

Export Bitmap Size

Allows you to select the size of the Bitmap used in when exporting.

Log In

This feature is only available if you have the 21 CFR Part 11 option installed on your system. Use this feature to log into the MXP software if you are manually or automaticaly locked out of the system.

- See the heading Lock Software for details about manually locking the software.
- The system automatically locks you out of the software after a time interval of mouse or keyboard inactivity as defined by the System Administrator.

The System Administrator can also use the Log In feature to log into the MXP software when the system is manually or automatically locked. However, the User ID that was logged in before the lockout occurred is listed as the User ID for any activity the System Administrator performs while in the MXP software. To ensure accurate Audit Trail information, the System Administrator should log out as soon as possible after performing any needed actions in the MXP software.

Note: If you reach the limit of password attempts allowed, you are not able to log into the MXP software. You must ask the System Administrator to unlock you and/or reset your password before you can log into MXP software.

Log In Procedure

To log into the MXP software:

---

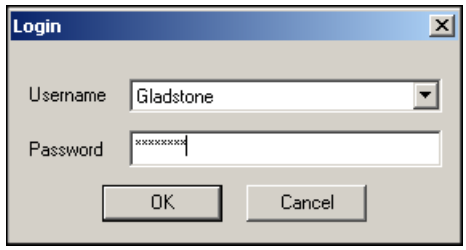
1 **File ▸▸ Log In**.

---

2 Enter your User ID and password.

OK.

Note: If the 21 CFR Part 11 option is installed, the System Administrator can log into the MXP software at this dialog box if the system was manually locked by a user.



Log Out

Allows a particular user to Log Out of MXP software so that another person can Sign-On.

If you have the 21 CFR Part 11 option installed:

- It also closes any open Excel workbook, and
- It also automatically logs you out of the DaCS software application.

Exit

This option closes down the MXP software and returns you to your Windows Desktop.

If you have the 21 CFR Part 11 option installed:

- It also closes any open Excel workbook, and
- It also automatically logs you out of the DaCS software application.

B.15 EDIT MENU

Undo

Edit ▸▸ Undo reverses software operations such as Region drawing, Region label editing and FlowPAGE editing. Each New operation is appended to an Undo list. The valid Undo operations are then performed in reverse order with each Undo request.

Note: Undo does not undo such operations as Save and Acquisition of data.

The **Edit ▸▸ Undo** list is cleared after each change of plot focus.

The **Edit ▸▸ Undo** function is applicable to the Window Menu, Regions, FlowPAGE and fonts.

Redo

Edit ▸▸ Redo reverses the last Undo operation.

If a new operation is performed after a series of **Edit ▸▸ Redo** operations, the **Edit ▸▸ Redo** list is cleared and all previous Undo actions are lost.

The **Edit ▸▸ Redo** list is cleared after each change of plot focus.

Cut

Edit ▸▸ Cut deletes the highlighted items from the display, placing them within the Clipboard. These items can be recalled either by using the **Copy**, **Paste** or **Paste Special** options within the **Edit** menu.

If you **Edit ▸▸ Cut** another item before the first item is Pasted, this first item is overwritten.

See also:
Copy
Paste
Paste Special

Copy

To Copy Statistics, Regions or Plot Images onto the Windows Clipboard,  **Edit ▸▸ Copy**.

This allows for Pasting these items into other areas of MXP software or to other Windows Applications such as MS PowerPoint®, Word, Excel, and so on.

The exact nature of what can be pasted depends upon the target application and can be controlled or modified using the target applications **Edit ▸▸ Paste Special** command.

See also:
Cut
Paste
Paste Special

Paste

After copying into memory, MXP software allows the pasting of a number of different items.

The default paste result depends upon what you are trying to paste.

- If the target is a FlowPAGE, the Plot Image and Statistics are Pasted.

---

1 Select the Plot of interest to be copied.

---

2  the Plot and hold down the left mouse button. (The No Drop Cursor  is displayed.)

---

3 Drag the cursor onto the FlowPAGE. (The Drop Cursor  is now shown.)

---

4 Release the mouse button to paste the Plot Image plus the Statistics onto a FlowPAGE.

Note: If you use Ctrl+  to Drag and Drop, you get the Plot Image but not the Statistics.

- If the Paste target is a Plot, then regions are Pasted.

---

1 Select the Plot with the region of interest to be copied.

---

2 Drag the cursor to the destination plot.

---

3 Release the mouse button to paste the Regions onto the Plot.

Note: If the copied region is required as a gate, use Ctrl +  to Drag and Drop the region.

See also:
Cut
Paste
Paste Special

Paste Special

Allows which form of a copied object is pasted. Bitmaps, Text or Region may be pasted depending on the copy source and the paste target.

See also:
Cut
Copy

Delete

When **Delete** is used, any selected items are deleted. In certain circumstances, it may be possible to reverse the **Delete** action by selecting the **Undo** option.

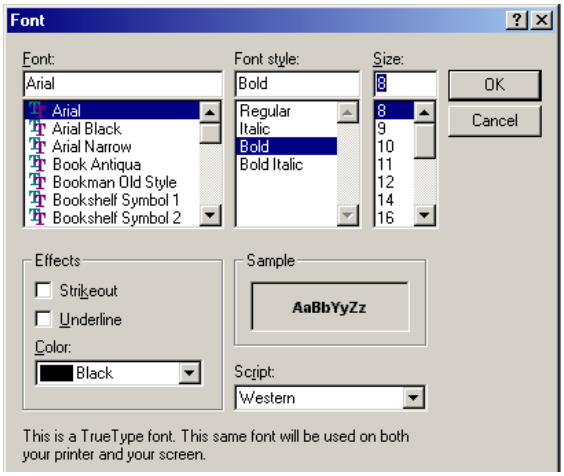
See also:
Undo

Edit Font

Edit Font

You can modify the Font type, size and color of selected text. The fonts available depend upon the fonts installed in Windows. If in doubt, try to use only True Type fonts.

The fonts selection dialog box is the standard Windows common dialog box for font selection and is fully explained in the Microsoft Windows documentation.



For True Type fonts, you can generate both horizontal and vertical fonts for the Plots.

For non-True Type fonts that do not have point sizes for both horizontal and vertical (portrait and landscape), Windows attempts to use a horizontal font for the vertical direction. Under these circumstances choose another font or reload the font of your choice making sure the font sizes required are available in both portrait and landscape types.

Please see the Microsoft Windows documentation on loading new fonts.

See also:
Edit Font (FlowPAGE)
Font

Edit Font (FlowPAGE)

To change the fonts in FlowPAGE:

---

1 Double click on a plot or text box to display the grap handles.

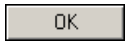
---

2 Click the right mouse button on the plot or text box to display the properties dialog box.

---

3  the Font tab.

---

4  the desired font, font style, size and color. Underlined or strikethrough text can be shown.  

to set your new values.

---

5  once outside the plot or text box. The cursor reverts back to the Chooser cursor  and the handles disappear.

See also:
Font

B.16 VIEW MENU

Acquisition Manager

Note: If no Worklist is visible, **View ▸▸ Acquisition Manager** to display the Worklist pane.

The Acquisition Manager is used to view and print a Worklist for the Cytometer. The information to create a Worklist is defined in the Plate Wizard. Once created, the Worklist cannot be edited.

Print Worklist

Click the right mouse button in any Acquisition Manager column heading,

Print Worklist to access the Print dialog box and print the Worklist.

See also:
ACQUISITION MANAGER TOOLBAR
Worklist Columns Available
Acquisition Manager - Panel
CREATING NEW PLATE/WORKLIST
CREATING PANELS

Worklist Actions

When you run a sample plate

- The well in process is highlighted and an arrow appears next to it.
- Completed wells remain highlighted.

	Panel	Protocol	P1	P2	P3	P4	P5	P6	P7	P8	Well Loc	Plate ID	Sample ID 1	Sample ID 2	Sample ID 3	Sample ID 4	LMD Filename	Cal Factor	Instru Setti
1		Cytokine.pro	FL1 Log	FL2 Log	FL4 Log	FS Log	SS Log	FL2 Lin	FS Lin	SS Lin	A1	cytokine.tdf	5000	Calibrator	R_1	D_ = 1	01_Cytokine.p 5000 Calibrator R_1		
➜		Cytokine.pro	FL1 Log	FL2 Log	FL4 Log	FS Log	SS Log	FL2 Lin	FS Lin	SS Lin	A2	cytokine.tdf	2500	Calibrator	R_1	D_ = 2	02_2500 Calibrator R_1 D_ = 2 765		
3		Cytokine.pro	FL1 Log	FL2 Log	FL4 Log	FS Log	SS Log	FL2 Lin	FS Lin	SS Lin	A3	cytokine.tdf	1250	Calibrator	R_1	D_ = 4	03_1250 Calibrator R_1 D_ = 4 766		
4		Cytokine.pro	FL1 Log	FL2 Log	FL4 Log	FS Log	SS Log	FL2 Lin	FS Lin	SS Lin	A4	cytokine.tdf	625	Calibrator	R_1	D_ = 8	04_625 Calibrator R_1 D_ = 8 767.		
5		Cytokine.pro	FL1 Log	FL2 Log	FL4 Log	FS Log	SS Log	FL2 Lin	FS Lin	SS Lin	A5	cytokine.tdf	312	Calibrator	R_1	D_ = 16	05_312 Calibrator R_1 D_ = 16 768		
6		Cytokine.pro	FL1 Log	FL2 Log	FL4 Log	FS Log	SS Log	FL2 Lin	FS Lin	SS Lin	A6	cytokine.tdf	156	Calibrator	R_1	D_ = 32	06_156 Calibrator R_1 D_ = 32 769		
7		Cytokine.pro	FL1 Log	FL2 Log	FL4 Log	FS Log	SS Log	FL2 Lin	FS Lin	SS Lin	A7	cytokine.tdf	080	Calibrator	R_1	D_ = 64	07_080 Calibrator R_1 D_ = 64 770		
8		Cytokine.pro	FL1 Log	FL2 Log	FL4 Log	FS Log	SS Log	FL2 Lin	FS Lin	SS Lin	A8	cytokine.tdf	040	Calibrator	R_1	D_ = 128	08_040 Calibrator R_1 D_ = 128 77		
9		Cytokine.pro	FL1 Log	FL2 Log	FL4 Log	FS Log	SS Log	FL2 Lin	FS Lin	SS Lin	B1	cytokine.tdf	020	Calibrator	R_1	D_ = 256	09_020 Calibrator R_1 D_ = 256 77		

Worklist Columns Available

The following columns appear within the Acquisition Manager:

Panel
Protocol
Region Settings
Region Filename
Instrument Settings
Instrument Filename
Parameter Names
Well Loc
Plate ID
Sample IDs
LMD File Name
Cal Factor

Reordering Columns

The columns may be reordered by selecting a column or a group and using Drag and Drop to move it to the desired location. To move a column within a group, use Drag and Drop. To move a group of columns use Ctrl+Drag and Drop. Groups are defined by thick black lines, and items within the groups are separated by thin dotted lines.

Acquisition Manager - Panel

Panel

Displays the name of the currently selected panel.

Panel	Protocol
as 2c.pnl	AS 2C Flow-Set.PRO
as 2c.pnl	AS FL1 Comp.PRO
as 2c.pnl	AS FL2 Comp.PRO
as 2c.pnl	AS 2C Verify.PRO

See also:
Acquisition Manager
Worklist Columns Available
ACQUISITION MANAGER TOOLBAR
CREATING NEW PLATE/WORKLIST
CREATING PANELS

Acquisition Manager - Protocol

Protocol

Displays the name of the currently selected protocol.

Panel	Protocol
as 2c.pnl	AS 2C Flow-Set.PRO
as 2c.pnl	AS FL1 Comp.PRO
as 2c.pnl	AS FL2 Comp.PRO
as 2c.pnl	AS 2C Verify.PRO

Acquisition Manager - Region Settings and Filename

Region positions can be carried between different protocols within a panel – regions can, for example, be set on a control sample then carried through all the tests in a panel.

Note: In order for a region position to be carried into a new protocol the source and target region must satisfy all the following criteria:

- Regions must have the same name
- Regions must be of the same type
- Regions must be drawn on the same parameters.

All regions satisfying these criteria are carried from one protocol to another.

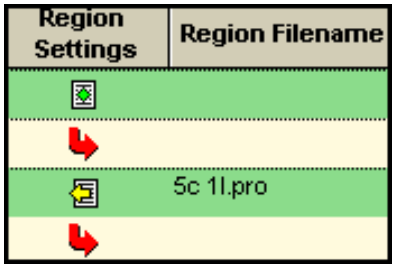
Region Settings

There are three options for the region settings:


This option loads the region positions from the current protocol


This option carries the region positions from those of the previous well or tube in a panel.


This option loads region positions from the protocol selected in the **Use regions from this protocol** field of the Panel Wizard.



Region Filename

Displays the name of the protocol selected in the **Use regions from this protocol** field of the Panel Wizard.

See also:
Acquisition Manager
Worklist Columns Available
ACQUISITION MANAGER TOOLBAR
CREATING NEW PLATE/WORKLIST

Acquisition Manager - Parameter Names

Parameter Names

Column headings displaying the default parameter names from the protocol or panel. See Edit FCS Header Attributes for a way of saving parameter names in a protocol prior to acquisition. The Parameter Names can be customized and edited in the Panel Wizard.

In this example, the columns are numbered P1 to P6. The actual number present is determined by the number of parameters selected in the protocol; the maximum number you can have is 16.

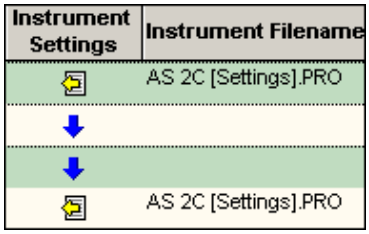
P1	P2	P3	P4	P5	P6
FS PEAK	FS	SS	CONTROL FITC	CONTROL PE	CD45 ECD
FS PEAK	FS	SS	CD3 FITC	CD19 PE	CD45 ECD
FS PEAK	FS	SS	CD3 FITC	CD4 PE	CD45 ECD
FS PEAK	FS	SS	CD3 FITC	CD8 PE	CD45 ECD
FS PEAK	FS	SS	HLA-DR FITC	CD19 PE	CD45 ECD
FS PEAK	FS	SS	CD10-FITC	CD19 PE	CD45 ECD

See also:
Acquisition Manager
Worklist Columns Available
ACQUISITION MANAGER TOOLBAR
CREATING NEW PLATE/WORKLIST

Acquisition Manager - Instrument Settings and Filename

Instrument Settings

Three-state toggle displayed as icons or bitmaps. These states being:




Loads the instrument cytosettings from the protocol,


Carries the instrument cytosettings through from the previous acquisition,

Note: When using the Instrument Settings column of the Aquisition Manager to carry settings between protocols within a panel, you should ONLY carry settings between protocols where the parameter number and order are identical.


Retrieves the instrument cytosettings from an external file. For example, from an AutoSetup protocol, another protocol or listmode file.

When the Use instrument settings from external file option is selected, the external file name is displayed in the Instrument Filename field.

Instrument Filename

Displays the external file name containing the instrument cytosettings used for this sample.

See also:
Acquisition Manager
Worklist Columns Available
ACQUISITION MANAGER TOOLBAR
CREATING NEW PLATE/WORKLIST

Acquisition Manager - Well Loc, Plate ID, and Sample Info

Well Loc	Plate ID	Sample ID 1	Sample ID 2	Sample ID 3	Sample ID 4
A1	**cytokine.tdf**	5000	Calibrator	R_1	D_ = 1
A2	cytokine.tdf	2500	Calibrator	R_1	D_ = 2
A3	cytokine.tdf	1250	Calibrator	R_1	D_ = 4
A4	cytokine.tdf	625	Calibrator	R_1	D_ = 8

Well Loc

Displays the row and column location of a well in a sample plate or a tube in the tube holder as programmed in the Plate Wizard (for example: A1, E40).

Plate ID

Displays the plate definition file name (*.tdf) for the current sample plate saved in the Plate Wizard.

Sample IDs

Up to four Sample ID fields are displayed. You can edit Sample IDs 2, 3 and 4 before data acquisition starts. From 3 to 24 characters can be used for each Sample ID. However, if you open this plate definition file (*.tdf) again in the Plate Wizard, the edited values for Sample IDs 2, 3 and 4 return to their original values.

By default, the Sample ID fields in the Acquisition Manager correspond to the following fields in the Plate Wizard:

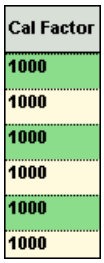
- Sample ID 1 corresponds to the Sample ID entered in the Plate Wizard.
- Sample ID 2 corresponds to Well Type.
- Sample ID 3 corresponds to the Replicate number.
- Sample ID 4 corresponds to Dilution value entered in the Plate Wizard (only applies to calibrators and controls).

See also:
Acquisition Manager
Worklist Columns Available
ACQUISITION MANAGER TOOLBAR
CREATING NEW PLATE/WORKLIST

Acquisition Manager - Cal Factor

Cal Factor

Displays the user defined Cal Factor entered in the Plate Wizard when using absolute count calibration particles with an assay count.

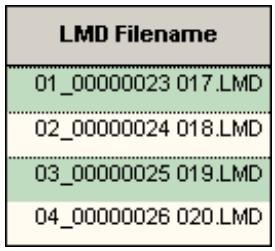


See also:
Acquisition Manager
Worklist Columns Available
ACQUISITION MANAGER TOOLBAR
CREATING NEW PLATE/WORKLIST
Absolute Count Calibration

Acquisition Manager - LMD File Name

LMD File Name

The File Name displayed in this column is only a provisional file name. Some available options (for example: Run Number and Time) can only be defined at the time of acquisition. If these elements are included in the file name and a printout of the Worklist with the final assigned file name is required, they only print correctly once acquisition of samples is complete. The well number is always placed at the start of each listmode file name.

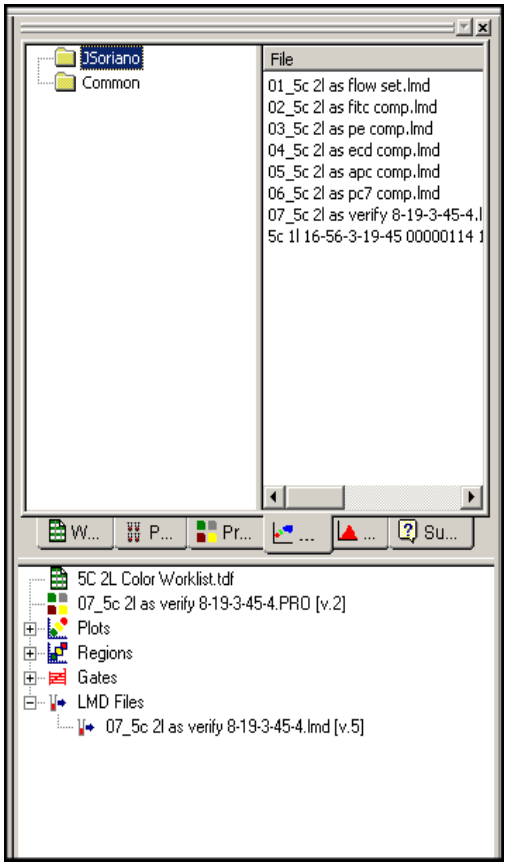


See also:
Acquisition Manager
Worklist Columns Available
ACQUISITION MANAGER TOOLBAR
CREATING NEW PLATE/WORKLIST

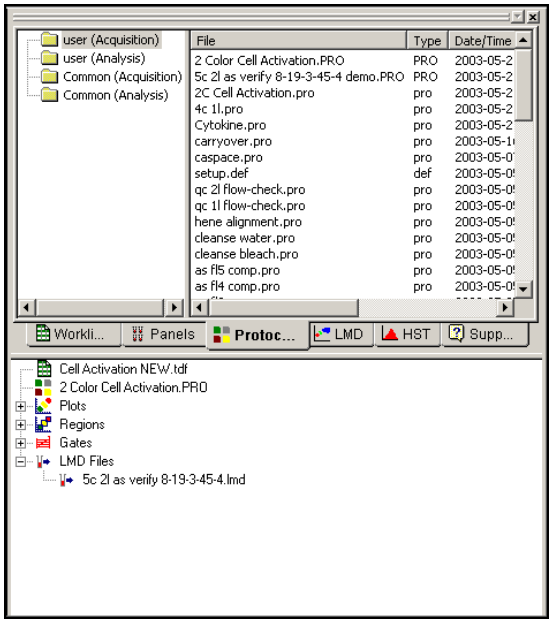
Resource Explorer

The Resource Explorer occupies a definable area within the Workspace. It allows you to browse files, and can be used to Drag and Drop items into MXP software. Tabs for Listmode files and Protocols allow files to be dropped into the Workspace. Listmode file tab displays the Listmode directories for the logged in user's Trays directory. Tabs for Panels and Histograms allow you to view all the panels and histograms for the selected directory.

Resource Explorer With 21 CFR Part 11 Option



Resource Explorer Standard MXP Software



The view that you see depends upon your particular access rights. User levels show only a particular user Listmode, Histogram and Protocol directory depending on the tab selected.

If you are a member of a particular Workgroup, all the user folders within that Workgroup are visible. The Support tab provides a link to the Beckman Coulter and ACS web sites as well as links to any ancillary Help files.

21 CFR Part 11 Option - Uncontrolled and Controlled Files

Definitions

Uncontrolled and controlled Panel, Protocol and Listmode files can appear in the Resource Explorer.

- Controlled Files

  A Panel, Protocol or Listmode file that has a version number and has been checked into the BCA&P database. Changes to a controlled file are saved to a different version of the file. Only controlled files can be used in the MXP software with the 21 CFR Part 11 option.

- Uncontrolled Files

  A non-versioned file that is actually located in Windows and has not been checked into the MXP software's BCA&P database. Because uncontrolled files can be changed outside of the MXP software without a record of the change made they are not within 21 CFR Part 11 compliance. To use an uncontrolled Panel, Protocol or Listmode file you need to check it into the MXP software (and the the BCA&P database).

How to Check In A File

To check in uncontrolled copies of Panel, Protocol or Listmode files into the BCA&P database of the MXP software, use any one of these methods:

- Drag and drop a protocol or listmode file from the Resource Explorer into your Workspace.
- Use **File ▸▸ Open Protocol** or **File ▸▸ Open Listmode** to open and check in a protocol or listmode file.
- Select and run a protocol in the Plate Wizard.
- Select and run a panel in the Plate Wizard. When you run a panel, all of its protocols are also checked in.

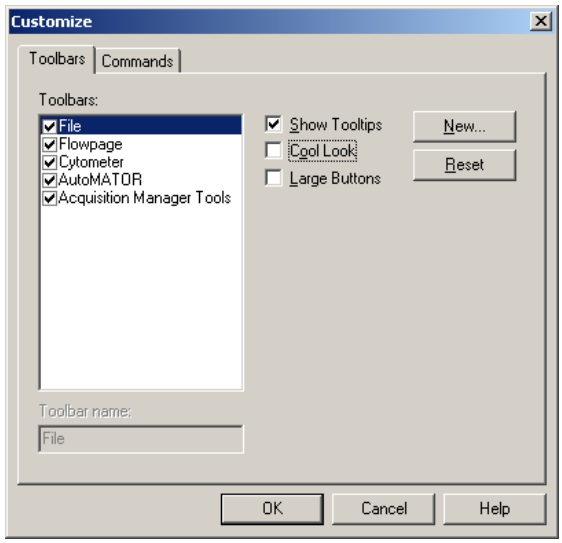
Any Panel, Protocol and Listmode files generated by the user within MXP software are controlled files, receive a version number and do not need to be checked in.

Note: Version numbers appear on Listmode and Protocol file names displayed in the lower portion of the Resource Explorer.

Toolbars - Customize Toolbars

This allows you to select the style and which Toolbars are displayed.

Toolbars
Toolbar Name
Show ToolTips
Cool Look
Large Buttons
New...
Reset



If a customized Toolbar has been created and this is highlighted, Delete is available to allow the deletion of that Toolbar.

See also, Toolbars - Customize Command

Toolbars

Select which Toolbars you wish to be displayed. Any customized Toolbars are listed.

Toolbar Name

Allows you to modify the name of any customized Toolbar. It is grayed out for the standard Toolbars.

Show ToolTips

Show Fly-over help when the mouse is pointed to the Icon.

Cool Look

This changes the style to a "cool" look.

Large Buttons

Changes the Icon buttons to a Large size.

New...

Displays a dialog box to enter your customized name of your new Toolbar.

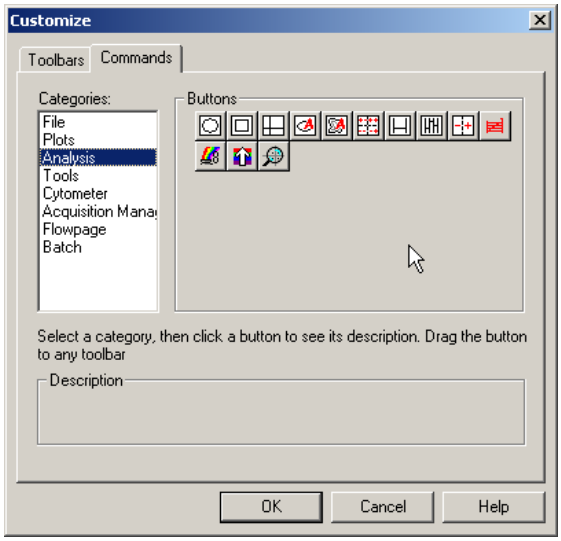
Reset

Resets the Toolbar to the default values.

Toolbars - Customize Command

This allows you to customize the Toolbars by dragging the button to the desired position within any Toolbar.

Categories
Buttons
Description



See also, Toolbars - Customize Toolbars

Categories

Displays the Toolbars that are currently available.

Buttons

Shows the buttons that may be selected for any Toolbar.

Description

Displays a description of the Icon button selected.

Zoom

The following option allows you to zoom in on a FlowPAGE to 100%, 200% or 400%.

Select the desired view. Selecting 100% returns to the default size.

Refresh

Selecting **View ▸▸ Refresh**, or pressing F5, causes MXP software to refresh the screen, all plots and FlowPAGEs. This option is useful when Windows fails to refresh the screen correctly leaving some graphical errors visible.

B.17 INSERT MENU

Blank FlowPAGE

To open a new blank FlowPAGE,  .

Note:

- The page displayed in the FlowPAGE is the same aspect ratio and paper orientation as used in the default Printer.
- The page scaling can be changed at any time after a FlowPAGE is created.
- Several FlowPAGEs can be created.

To close or delete a FlowPAGE, double click on the Control menu box in the upper left corner of the FlowPAGE window to be deleted.

All FlowPAGEs contain:

- Institution name
- Acquisition or playback protocol
- Acquisition date and time
- User ID
- Settings file name, date and time
- Listmode file name
- Total acquisition time and stop condition
- Sample ID 1
- Protocol status
- Analysis date
- Instrument serial number
- Software version

Note: If you have the 21 CFR Part 11 option installed on your system, all printed FlowPAGEs also display the version number of the Listmode and Protocol files.

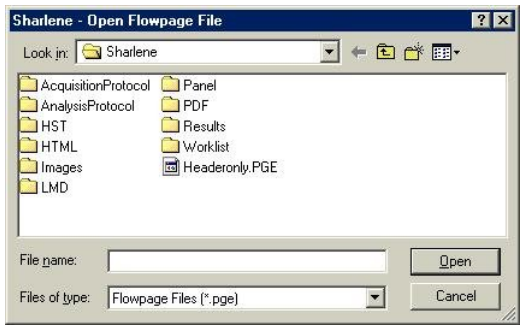
FlowPAGE from File

When a FlowPAGE has been created, (including all the departmental logos, addresses, plots, statistics and comment boxes), the whole FlowPAGE can be saved and retrieved at will.

Use the open FlowPAGE option to open a FlowPAGE template from disk. FlowPAGE uses the default file extension *.PGE. The *.PGE extension is only a suggested extension, any standard DOS characters can be used for the full file name.

---

1 **Insert ▸▸ Open FlowPAGE From File** to view the **Open FlowPAGE** dialog box.



---

2 the desired drive in the Drive List box.

---

3 the desired directory in the Folders List box.

---

4 the type of file in the Files List box and click.

---

5 the name of the file to view. OK.

Or

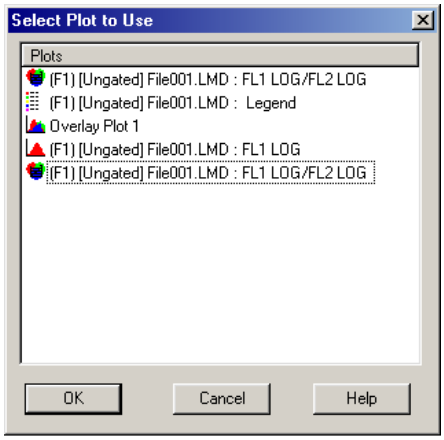
Double click on the file name to close the dialog boxes and display the file.

FlowPAGE Statistics Table

This option is used to insert statistics into FlowPAGE.

---

1 **Insert ▸▸ FlowPAGE Statistics Table**.



---

2 From the list of plots currently open in MXP software, the one containing the statistics you wish to insert.

3 Cancel or press Esc to exit the dialog box without accepting the changes.

---

4 The statistics for the selected plot are inserted into the FlowPAGE and can then be moved to the desired position.
Only one plot is permitted per statistics table.

FlowPAGE Textbox

This option is used to insert text into FlowPAGE.

---

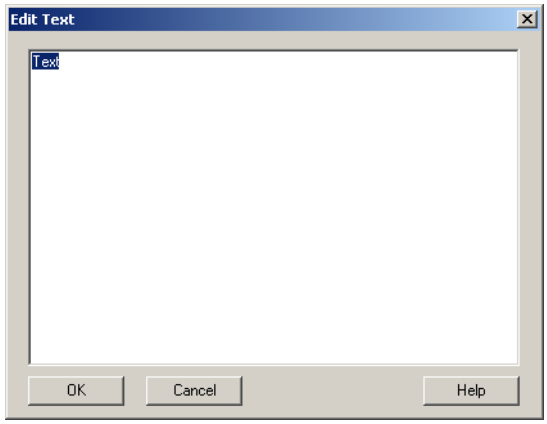
1 **Insert ▸▸ FlowPAGE Textbox**. An insert text cursor is displayed.

---

2 Move the cursor to the place for the textbox and .

---

3 Type the required text and OK.



---

4 outside the text box to accept the changes.

---

5 Click the right mouse button on the text box to edit properties, enter text, edit the font or change the alignment.

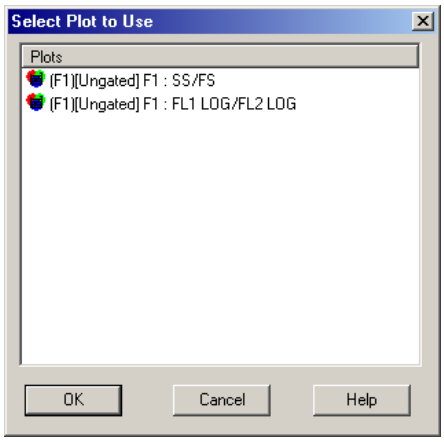
FlowPAGE Plot

Insert Plot

To insert plots currently displayed on the desktop into FlowPAGE.

---

1 **Insert ▸▸ FlowPAGE Plot** and a plot in the list.



---

2 OK. The plot is placed in the upper left corner of the FlowPAGE.

Inserting Drag & Drop Plot

Insert currently displayed plots on the desktop into FlowPAGE.

---

1 inside the plot to be inserted into FlowPAGE and hold down the left mouse button.

The No Drop cursor is displayed.

---

2 Drag the cursor onto the FlowPAGE. The Drop cursor is now shown. Release the mouse button. The plot is now inserted into FlowPAGE.

Note: If you Drag and Drop the plot, the plot and the statistics are inserted. If you Ctrl+Drag and Drop the plot, the statistics are not inserted with the plot.

Other FlowPAGE Object

Inserting a Rectangle

---

1  **Insert ▸▸ Other FlowPAGE Object** and  the Rectangle option.
A cross-hair cursor + is displayed.

---

2  and hold down the left mouse button while you drag to size the rectangle.

---

3  outside the rectangle to anchor it.

See also:
Inserting a Line
Inserting a Picture
Inserting a Text File

Inserting a Line

Draw straight lines using **FlowPAGE ▸▸ Insert ▸▸ Line**.

---

1  **Insert ▸▸ Other FlowPAGE Object** and  the Line option.
A cross-hair cursor + is displayed.

---

2 Drag the cursor to desired line size and release the mouse button. The line is drawn and the cursor reverts back to the Chooser cursor  .

See also:
Inserting a Rectangle
Inserting a Picture
Inserting a Text File

Inserting a Picture

FlowPAGE allows the import of a Windows Bitmap file (extension *.bmp).

---

1 Use MS Paint or other graphics editor to create a bitmap file to be placed on a FlowPAGE and save it as a file.

Insert ▸▸ Other FlowPAGE Object and the **Picture** option.

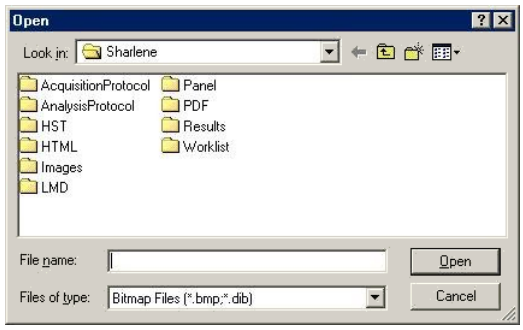
---

2 Select the desired bitmap file.

a. the desired directory in the **Look in:** list box.

b. the type of file in the **Files of type**: list box.

c. the name of the bitmap file you want to insert.
Note: Double click on the file name to close the dialog box and display the file.



---

3 the FlowPage location where you want to place the picture.

See also:
Inserting a Line
Inserting a Rectangle
Inserting a Text File

Inserting a Text File

1 **Insert ▸▸ Other FlowPAGE Object** and the Text File option.

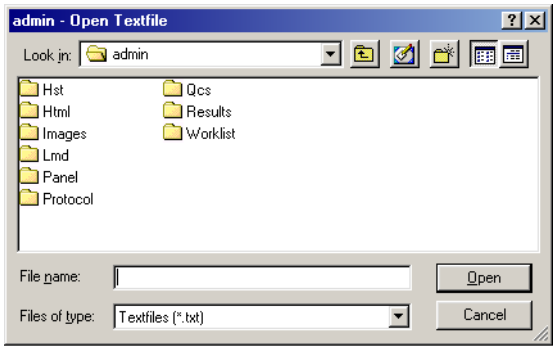
Note: Use MS Notepad or other text editor to create text (*.txt) files.

2 Select the desired text file.

a. the desired directory in the **Look in:** list box.

b. the type of file in the **Files of type:** list box.

c. the name of the text file you want to insert.
Note: Double click on the file name to close the dialog box and display the file.



3 The text box is placed in the upper left corner of the FlowPage.

a. Use to move the text box to the desired location.

b. ouside the text box to anchor it.

See also:
Inserting a Line
Inserting a Picture
Inserting a Rectangle

Other Insert Menu Items

Annotation
This feature is not available in MXP software.

Auto Text
This feature is not available in MXP software.

Overlay Histogram
This feature is not available in MXP software.

FlowPAGE Analysis Results
This feature is not available with MXP software.

FlowPAGE Analysis
This feature is not available with MXP software.

B.18 TOOLS MENU

Publish Histogram Data Now

This feature is not available in MXP software.

Publish Results Now

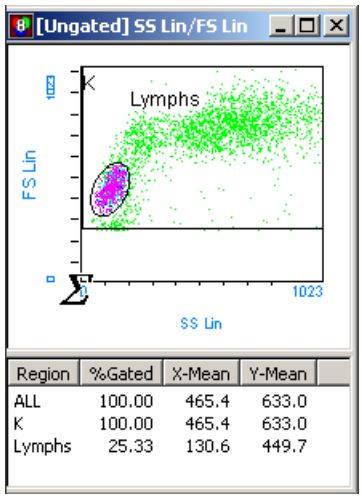
Statistics are displayed under plots in resizable columns and can be exported to Microsoft Excel or ASCII text (.txt) file format.

The Workspace Preferences – Publish tab option **Publish Data to Text File** and/or **Publish Data to MS Excel**  must be enabled. See Workspace Preferences - Publish. If publishing to Excel, the default workbook file name consists of the Listmode file name with a time and date stamp added. The file is saved to the user's Results directory. The data can be published in Column Format or Experiment Table Format depending on your selection in the Workspace Preference Publish tab.

To open the Statistics Pane, move the mouse over the Plot so that the ∑ (Sigma Cursor) is displayed and click the left mouse button. The Statistic Pane drops down showing ALL the Plot statistics. To hide the Statistics Pane, click the mouse on the Sigma cursor again.

If other Regions are added or deleted while the Statistics Pane is open, it is automatically resized to accommodate the change.

Plots, including the Statistics Pane, can be resized at any time by dragging any part of the Window Frame although the height of the Statistics Pane remains unchanged.



The Statistics Pane can only be resized by using the ⇕ Splitter Bar while holding down Ctrl. Use the mouse to drag the revealed Statistics Pane to the required position. If resizing is achieved using the splitter bar, the automatic sizing using the ∑ (Sigma Cursor) is overridden.

Auto sizing is the default mode selected when the Plot is first created whereas user-defined sizing is selected as soon as resizing occurs using the Splitter Bar. To reinstate the Auto sizing, hold down Ctrl while clicking the ∑ (Sigma Cursor) with the mouse.

AutoMATOR

Welcome to AutoMATOR

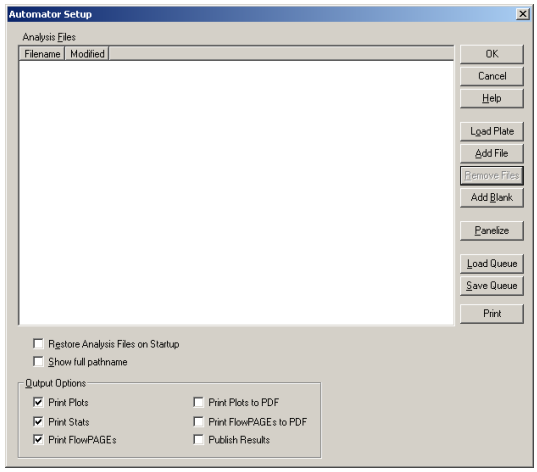
Use the AutoMATOR option to sequentially read, analyze and report a set of listmode files. AutoMATOR performs batch analysis of stored data using a multi-file protocol.

AutoMATOR allows listmode files to be read and analyzed in a sequential or a predetermined batch order.

AutoMATOR Setup

---

1  to display the set of files last used. If these files are not required, highlight them and  Remove Files.



Reordering Files
Load Plate
Add File or Add Files
Remove Files
Add Blank
Panelize
Load Queue
Save Queue
Print
Restore Analysis Files on Startup
Show full pathname
Output Options

---

2  Add File, Load Plate, or Load Queue to select the required file/files.

---

3 Navigate to the correct directory and locate the relevant file/files.

4 Select the relevant file by highlighting with the mouse.

If you do not have the 21 CFR Part 11 option, you can select more than one LMD file at a time. To select more than one file, hold down Ctrl and click the relevant files with the mouse button (to deselect, click again while Ctrl is held down).

5 **Open**.

The files are listed in the AutoMATOR Setup dialog box.

Note: For the 21 CFR Part 11 option, you can repeat steps 4 and 5 as often as needed until all the files you need are listed.

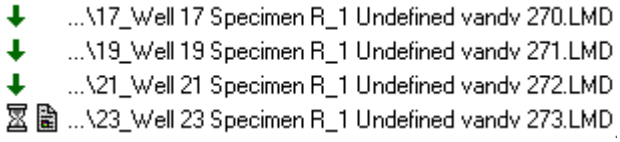
6 OK to accept changes. Cancel does not apply any of the changes made.

Note: To select all the files, press Ctrl+A.

Status Icon:

	Pause	The Auto Pause function pauses the run of tests and then carries on with the rest of the panel automatically after a 15 second wait. The countdown shows on the AutoMATOR Status Bar. When the tests are in the Auto Pause setting, you can hold down Shift and click the Pause button. Shift overrides the Auto Pause, placing the AutoMATOR into Continuous Pause. To restart, click the Run button and the test resumes from the point at which it was paused.
	Continuous Pause	Pauses for modifications and remains on pause until you decide that processing will continue. This function allows the test to stop without reverting to the beginning of the panel again. To resume the test, click the Run button.
	Continue	Plays back the indicated file without pausing.

These icons allow you to insert a pause or a stop into the panel, or let the panel run straight through from start to finish. Clicking repeatedly on the icon until it displays the desired status modifies the status in the highlighted file.



In this example, the four files would run and then pause before printing. This allows you to make any necessary alterations to the plots and regions before outputting results.

Report Icon:



Once the files have been panelized, the report icon only appears next to the last file, as a report print out would only be produced after all files in a group have been run. (This differs from Acquisition Manager where there is a printout after each test that has run). This is providing that the correct Output Options have been selected.

Once the files have been panelized, you can select all or a block of the files so that they are highlighted. If the icon on one of the highlighted files is changed, all of the other selected files change to the same icon simultaneously. To change the status settings for one file only, highlight the file and then click on the icon until it changes to the desired status.

Reordering Files

Once all files are listed, they can be arranged in File Name or Date and Time order by clicking on the relevant column title. Rearrange files by Dragging and Dropping them.

---

1  on the relevant file so that it is highlighted.

---

2 Hold the mouse button down and drag the file to the appropriate position so that it is between two file names.

---

3 Release the mouse button.

If there are a number of files in the AutoMATOR Setup dialog box, you can either use the scroll bar, or utilize the Drag and Drop option.

Select a file using the mouse, keep the mouse button held down and drag to either the top or the bottom of the window. Moving the cursor outside the window scrolls the list. The further the cursor is pushed to the top/bottom, the faster it scrolls.

Load Plate

Displays a dialog box to select and load a plate definition file (*.tdf) or worklist file (*.wls). This loads all of the files generated by the corresponding worklist.

Add File or Add Files

Select this option to display the Open Listmode File dialog box.

- **21 CFR Part 11 Option:** You can then search for other Files in various drives and directories. Select the name of the listmode file you want to add. You can only add one listmode file at a time. The most recent version of the listmode file is opened. You can repeat this procedure to add multiple files to the AutoMATOR Setup screen.
- **Standard MXP Software:** You can then search for other Files in various drives and directories and add them to the list. Select the name of the listmode file(s) you want to add.

Remove Files

When selected, this option removes any highlighted files within the AutoMATOR Setup dialog box. The Delete button performs the same function.

Add Blank

A Blank is used to fill a space when there is an incomplete panel of listmode files, so that the results from the tests are kept in the correct order and a complete panel is maintained.

When selected, this option puts a blank at the end of the file list. This can then be Dragged and Dropped into the required position.

Panelize

This sets the files into groups or panels based on the number of files open in the workspace. The report icon displayed next to a file identifies the last file in each group. Changes made to the Pause or Stop options for the first panel may be carried through all selected files by selecting Panelize.

If you attempt to run a test when the files are panelized and an incomplete panel is included, *Incomplete Panel* appears giving you the option of going back to the AutoMATOR to amend the problem.

Load Queue

Displays a dialog box to load a queue (.ALQ) file.

Save Queue

Displays a Save dialog box to save the queue to a file. The files are saved in the LMD subdirectory under the file extension ALQ.

Print

Print a listing of the files in the queue.

Restore Analysis Files on Startup

If the checkbox is enabled, all the files displayed in the Analysis File list appear in the list the next time that you log in.

If the checkbox is not ticked, the list is empty the next time you log in.

Show full pathname

Shows the paths to the destination directories for the selected listmode files.

Output Options

These options consist of several checkboxes found at the bottom of the AutoMATOR Setup dialog box. Check the required output options to print or publish data at the completion of each sample.

The options are:

- Print plots as displayed.
- Print statistics only.
- Prints all FlowPAGEs.
  If these are not selected, the Page icon appears crossed out, and a report is not printed from the test.
- Publish Plots or FlowPAGES in PDF format.
- Publish Results
  Allows the automatic publishing of results to a text file or Microsoft Excel spreadsheet at the completion of each sample depending on the Workspace Preferences selection.

  If publishing to Excel, a maximum of 96 files can be replayed in one run. The default workbook file name is the current protocol file name with a time and date stamp added. The file is saved to the user's Results directory. The number of worksheets produced depends on whether you selected Column Format or Experiment Table Format on the Workspace Preferences Publish page.

AutoMATOR Status Bar

This shows the current file being run and the current state of that file.



The AutoMATOR Status Bar, which displays the function that the test is performing, can be removed from the screen.

Click on the Close button featured on the Status Bar while the AutoMATOR is running. This hides the bar from view. It automatically reappears again the next time the AutoMATOR is run. The Status Bar cannot be brought back onto the screen once closed down without reopening AutoMATOR.

- Processing
  This is when the file is being analyzed by the software.
- Auto Pause
  When this command is active, it informs you as to the length of time left in pause before the analysis resumes. If this length of time is not required, selecting the Run button again can restart the analysis.
- Continuous Pause
  This informs you that the processing is paused and can only continue if you restart the analysis manually by selecting the Run button again.

Listmode Playback

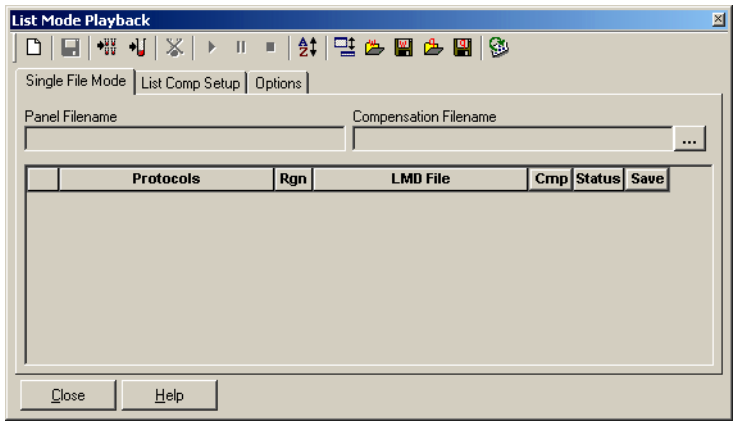
The Listmode Playback option allows for listmode playback with the runtime protocol/panel or with a new protocol/panel. This option also allows listmode compensation of 20-bit data files in a fully automated manner, replicating the procedure used during analysis. Compensation settings may be verified and manually adjusted if required.

The Options tab allows setting of default options during listmode playback.

Note: If you have the 21 CFR Part 11 option installed, the Open Playback Panel Files dialog box accessed by contains the **Show Archived** checkbox and the **Versions** button. The Save Playback Panel Files dialog box accessed by contains the **Comments** fields.

See also:
Open Protocol Procedure - With the 21 CFR Part 11 Option Installed
Save Protocol As Procedure - With the 21 CFR Part 11 Option Installed

Single File Mode



This mode allows for single file or panel based listmode file playback, similar to acquisition of samples.

A single panel may be selected; multiple copies of this panel may be run at a time. Samples may be added or removed from individual panels.

Load Queue loads a listmode queue file (a list of listmode files).

Replay Plate  loads a *.WLS file containing all the listmode files for a sample plate.

Regions may be Loaded or carried within a panel, AutoGating and positives analysis can be active on any protocol within a panel

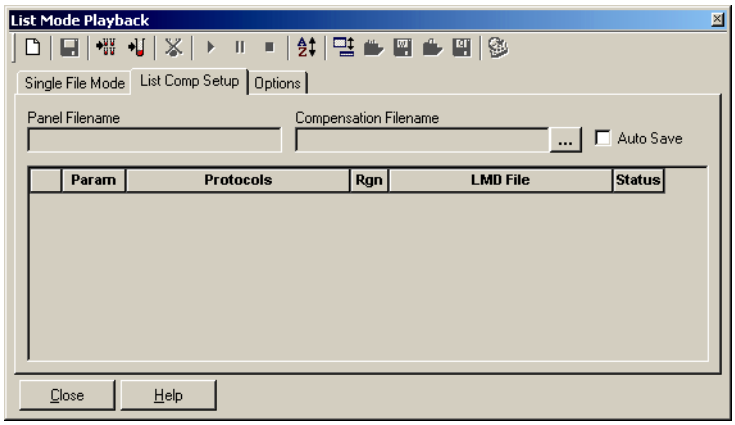
Where the source listmode file is a 20-bit data file, comp settings can be Run Time (as stored within the LMD file) or the Compensation settings file created in ListComp Setup or any *.CMP file may be used.

During playback the title bar displays the current file being analyzed.

Optionally a new file may be saved containing newly compensated 10-bit data. The original LMD file cannot be overwritten automatically.

Saved files have the suffix entered in the Options tab appended to each saved file.

List Comp Setup



This dialog provides an Acquisition Manager style worklist for the selection of compensation panels and associated protocols. *.ppp files created from the protocols used in the AutoSetup applications do not need the *negative control.pro or *Flow-Set.pro protocols. These *.ppp panels allow you to replay the associated LMD files to create *.cmp files. Runtime panels may be selected, as these contain Flow-Set fluorospheres protocols which have no use in this dialog, this protocol is removed from the displayed panel and a warning is displayed.

The dialog is resizable by dragging the corners to the required size.

The settings file name defaults to the name of the panel but with a new *.cmp extension.

The Auto save checkbox allows settings to be automatically written to the settings file that has the name of the panel selected.

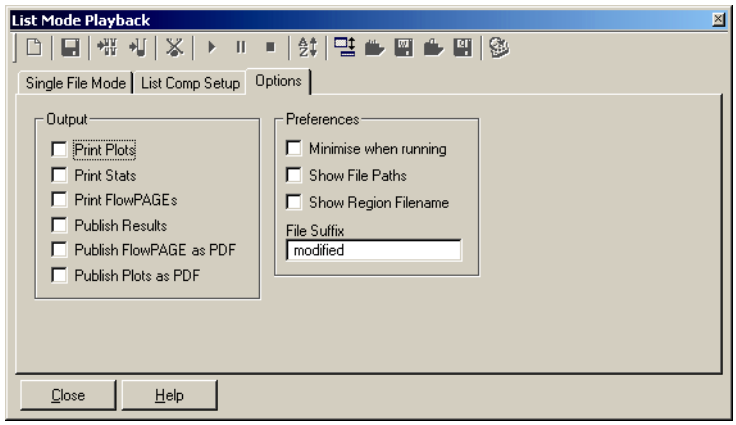
Panels can be created within this dialog, but cannot be used for acquisition. These listmode panels are saved with a *.ppp extension.

The Parameter field indicates the Compensation parameter within the protocol.

The Status field allows a pause or stop between each file playback.

Note: Listmode Compensation must be performed using the runtime protocol or a protocol with equivalent parameters as the runtime protocol.

Options Tab



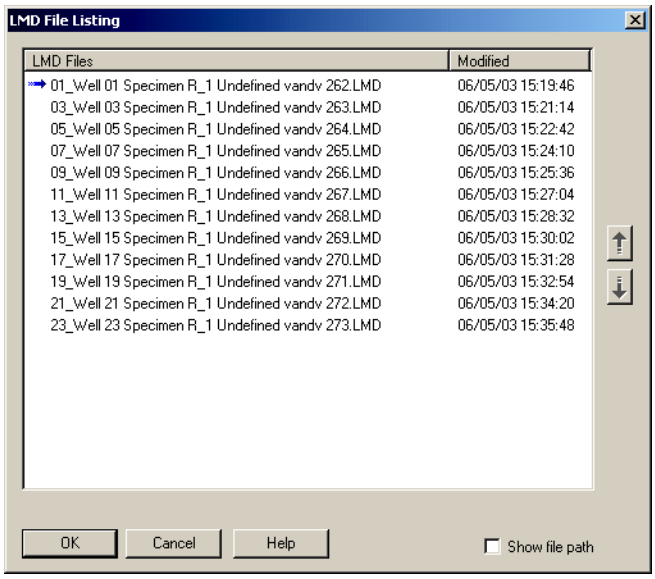
This tab allows setting of default options for the Listmode Playback, Print options, publish functions, file save naming options are set in this dialog box.

If you selected **Publish Results** here and **Publish Results to Excel** on the Workspace Preferences Publish page, this is how the the Excel workbook file is named and saved. When using the Replay Plate  feature, the workbook file name consists of the Plate ID for the replayed sample plate followed by the **File Suffix** selected here. When not using the Replay Plate feature, a maximum of 96 LMD files can be replayed and the workbook file name consists of the first protocol in the listmode playback list followed by the **File Suffix** selected and the original date and time stamp. A new Excel workbook is created for the replayed data. The workbook file is saved to the user's Results directory. The number of worksheets produced depends on the number of protocols used in the worklist and whether you selected Column Format or Experiment Table Format on the Workspace Preferences Publish page.

File Sorting - In the Listcomp setup or Single file mode options, listmode files may be sorted using the LMD File Listing option. This allows files to be sorted alphabetically, or by Time / Date modified. Files may be Dragged and Dropped. Individual files may be selected and moved up or down the list using the arrow buttons.

The start of each panel is indicated by an arrow.

A **Show File Path** checkbox allows the full file path for each file.



AutoSetup Application Definition

This option is not available with MXP software.

AutoSetup Scheduler

This option is not available with MXP software.

B.19 PLOTS MENU

Plots - Introduction

MXP software can display eight Plot types and the Legend for Color Gated Plots. When a Plot is displayed, click the right mouse button to display further menu options.

Color Dot Plot
Histogram Plot
Contour Plot (not available)
Density Plot
Overlay Histogram Plots (not available)
Tomogram Plot (not available)
Surface Plot (not available)
Prism Plot
Legend

Duplicate Plot

This option creates an exact duplicate of the currently selected Plot.

Ctrl+D may be used as a keyboard shortcut for the same function.

Color Dot Plot

The Color Dot Plot option provides two-parameter displays of data and allows any combination of the parameters to be selected. Each dot in a Color Dot Plot represents one event (cell or particle). The dot location gives the parameter values for each event. Each parameter can have a channel number from 0 to 255 for 256 channel data or 0 to 1023 for 1024 channel data. The colors of the dots reflect the Gate or combination of Gates used to create the plot.

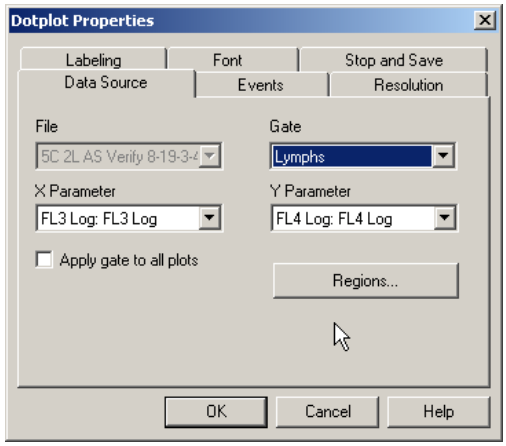
To Create a Color Dot Plot:

---

1  .

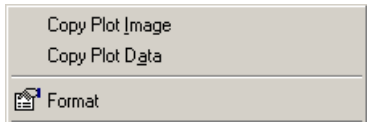
---

2 From the dialog box displayed, select the required File, then select desired Gates, Parameters and Regions for display.
Dot Plot Data Source
Dot Plot Events
Dot Plot Resolution
Dot Plot Labeling
Font
Stop and Save (acquisition only)



---

3 When a Plot is displayed, click the right mouse button within the plot to display further menu options.
Copy Plot Image
Copy Plot Data
Format Plot



Copy Plot Image

Copies the current plot image into memory for pasting into other applications. See Copy for more details.

Copy Plot Data

Copies the raw plot data into memory for pasting into other applications, such as Microsoft Excel.

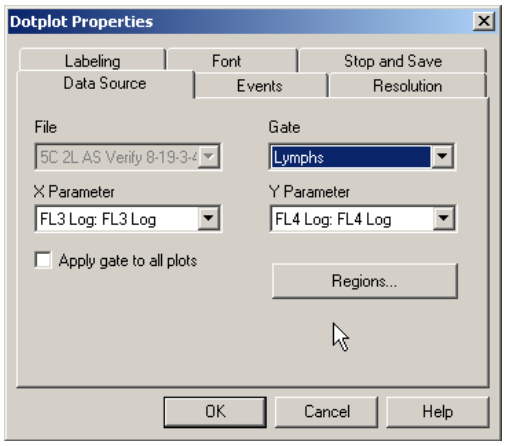
Format Plot

Displays the Plot Properties dialog box for the current plot. See Format Plot.

Dot Plot Data Source

Choose the X and Y parameters for the current plot. Gating equation and regions to be displayed can be selected.

File
Gate
X and Y Parameter
Apply Gate to All Plots
Regions



File

Select the required file from the files already in memory, displayed in the drop down box, or click the browse button to explore your directories for the required file.

Browse Button

Allows you to peruse other directory options and select files as appropriate.

X and Y Parameter

Select the required parameter for display from those available in the list.

Gate

Available Gates are listed. Gates required for Advance Precedence should be selected at this point. See Modify Color Precedence.

Apply Gate to All Plots

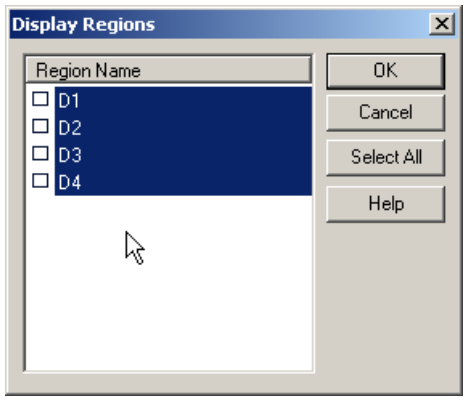
To select this option, enable the checkbox and apply the gate selected to all plots.

Regions

After Regions have been created, use this option to select or hide which Regions you wish to view on a plot. Existing Regions are listed in the Select Regions list box. The highlighted Regions correspond to the Regions already displayed in the current plot window. Only Regions sharing the same parameters and Gates as the current plot can be displayed.

---

1 the region names you want to display on the plot. If Automatic Gate Maintenance is enabled, gating regions do NOT appear in the list of available regions.



---

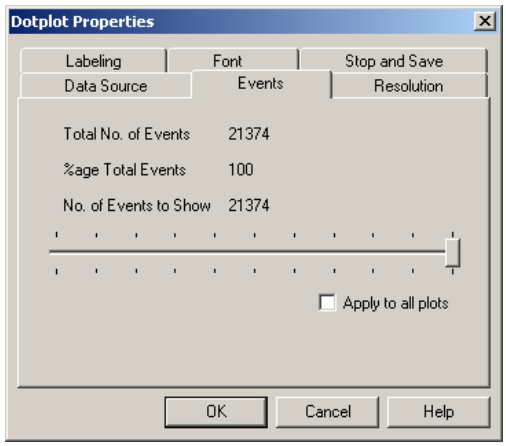
2 OK.

Dot Plot Events

Use this to specify the percentage of events to view. This option significantly increases the speed at which dot plots refresh if large data files are being analyzed. For an event interval less than 100%, data is displayed uniformly from within the whole of the data file, that is, if 10% of events are selected then event numbers 1, 11, 21, 31, and so on, are displayed if they meet the Gating criteria for the plot.

The default value for the number of events to display can be set in the **File ▸▸ Workspace Preferences** and selecting the Plot Display tab.

No. of Events to Show
Apply to All Plots



See also:
Workspace Preferences - Plot Display
Dot Plot Data Source
Font

No. of Events to Show

Place the cursor on the Slide bar and move to change the **No. of Events to Show**.

Apply to All Plots

Enable this checkbox to apply the **No. of Events to Show** to all Plots.

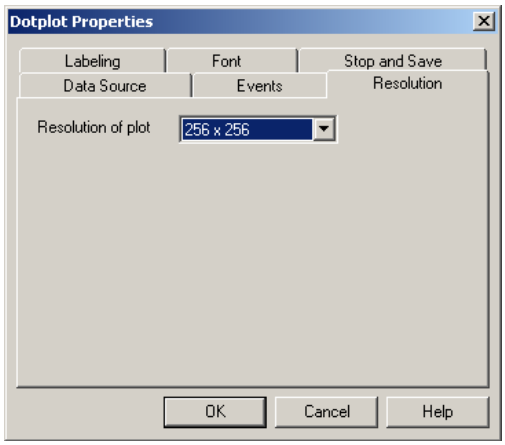
Dot Plot Resolution

Set the number of channels for the X and Y Axis of the Plot.

The available options allow for 64, 128, 256 and 512 channels to be displayed on the axis.

A higher resolution gives an improved graphic image whereas a lower resolution allows faster redrawing of that image.

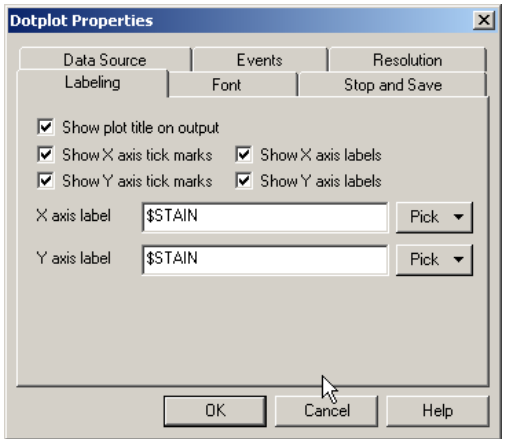
Note: If a higher resolution is selected, a sufficient number of events is required to produce a visually acceptable graph.



Dot Plot Labeling

The options here allow you to override the default plot display options for the current plot. This is useful when capturing images for publication.

Show Plot Title on Output
Show Axis Tick Marks
Show Axis Labels
X and Y Axis Labels



Show Plot Title on Output

Unchecking this option prevents the plot title from appearing when the plot is printed or exported.

Show Axis Tick Marks

Unchecking these options hides the axis scale tick marks and labels.

Show Axis Labels

Unchecking these options allows the axis parameter name to be hidden.

X and Y Axis Labels

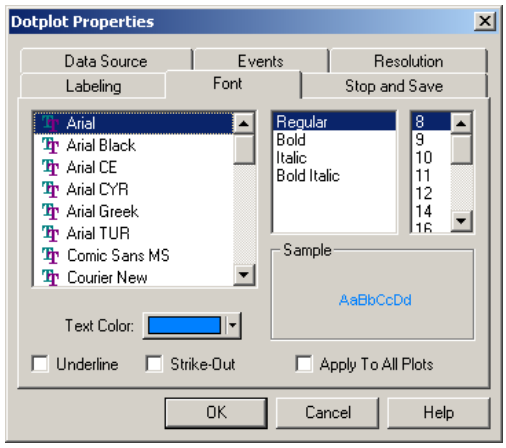
Allows custom naming of the parameters on the current plot, any FCS keyword or text may be entered. Alternatively select **Pick** to select from File Name, Stain name ($PnS) or Parameter name ($PnN).

Font

Select the required Font Type, Font Style and Point Size.

Other font attributes available are **Underline**, **Strike-Out** and **Text Color**. The default color is black.

The **Apply To All Plots** checkbox allows the selected font to be applied to all the currently displayed plots. You should choose True Type fonts so that X and Y axis displays are available.



Histogram Plot

Single parameter histograms show the frequency distribution of the chosen parameter. All histograms can be customized, that is, Colors, Gate for histogram, Scaling, and so on.

To create a Histogram Plot:

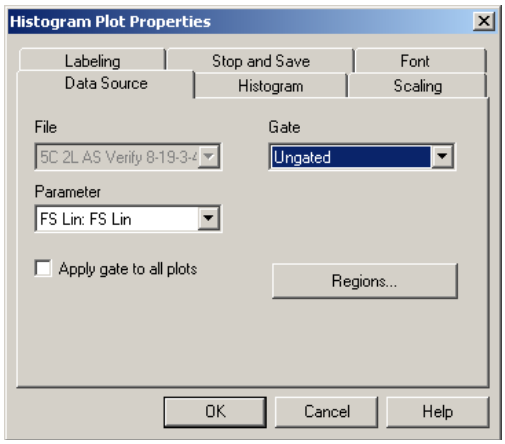
---

1  .

---

2 From the Data Source dialog box displayed, select the required File, then select desired Gates, Parameter and Regions for display.

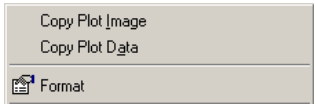
Histogram Plot Data Source
Histogram Formatting
Histogram Scaling
Histogram Labeling
Stop and Save



---

3 When a Plot is displayed, click the right mouse button to display further menu options.

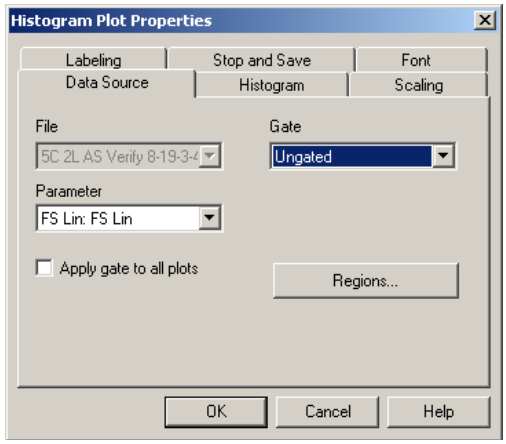
Copy Plot Image
Copy Plot Data
Format Plot



Histogram Plot Data Source

Choose the parameter and gate for the current plot. Gating equation and regions to be displayed can be selected.

File
Gate Selection
Parameter
Apply Gate to All Plots
Regions

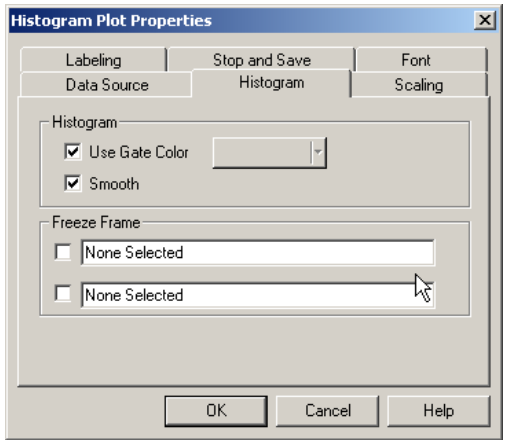


Parameter

Select the required parameter for display from those available in the list.

Histogram Plot Configuration

Use Gate Color
Smooth
Freeze Frame



Use Gate Color

If the **Use Gate Color** option is checked, the Histogram fill color is the same as the default color for the Gate that the plot is gated upon, and the Color Select button is unavailable. To change the color of the Histogram in the selected plot, clear the **Use Gate Color** checkbox and click the Color Select button. The colors returned are only those which the display is capable of rendering.

Smooth

If the **Smooth** box is checked, the visual representation of the Histogram is smoothed.

Note: If peaks observed during acquisition in a single parameter histogram disappear when the stop count is reached, remove the check from the **Smooth** checkbox. This condition occurs due to a small number of events in this plot.

Freeze Frame

Check a **Freeze Frame** box to assign the current Histogram. The top button creates a dotted overlay and the bottom button creates a dashed Histogram.

The current Histogram is assigned to whichever Overlay button is selected and its name appears in the edit box adjacent to the button. This legend may be modified if desired.

In order for Freeze Frame to work in Acquisition Manager, ensure that you select “Use Plots and Gates from Previous Test” in the Panel Wizard for the panel.

Histogram Freeze Frame

MXP software allows the display of up to three Histograms on each single parameter Histogram. The base Histogram is the one that relates to the current listmode file and the other two can be overlays from any other compatible file. Statistics are calculated from the base Histogram only.

The other two overlays are for comparison only and no statistical information can be obtained from them.

See also:
Create a Histogram Freeze Frame
Delete a Histogram Freeze Frame Overlay

Create a Histogram Freeze Frame

In order for Freeze Frame to work in Acquisition Manager, ensure that you select "Use Plots and Gates from Previous Test" in the Panel Wizard for the panel.

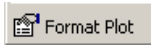
---

1 Read in a file or acquire data to be assigned as an overlay (for example: a negative control).

---

2 Highlight the chosen single parameter Histogram to be used as an overlay plot (click on the title bar).

---

3 Click the right mouse button on the plot and  

, then  the Histogram tab. See also Histogram Formatting.

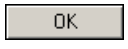
---

4 Check a **Freeze Frame** box to assign the current Histogram. The top button creates a dotted overlay and the bottom button creates a dashed Histogram.

---

5 The current Histogram is assigned to whichever overlay button is selected and its name appears in the edit box adjacent to the button, this legend may be modified if desired.

---

6  

or press Enter to accept any changes.

---

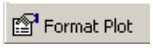
7  

or press Esc to exit the dialog box without saving the changes.

Now you can open another file or acquire a positive sample. The new data is displayed as the base histogram and the previous sample is seen as an overlay.

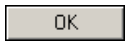
Delete a Histogram Freeze Frame Overlay

1 Highlight the plot containing the unwanted overlay (click on the title bar).

2 Click the right mouse button on the plot and  

, then  the Histogram tab.

3 Clear the appropriate Overlay Histogram checkbox to delete an overlay.

4  

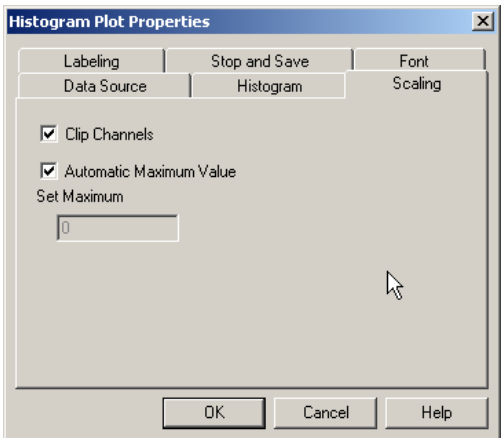
or press Enter to accept any changes.

5  

or press Esc to exit the dialog box without saving the changes. MXP software then updates the display.

Histogram Scaling

Clip Channels
Automatic Maximum Value
Set Maximum



Clip Channels

If Automatic Maximum Value calculation is used then toggling the Clip Channels on ensures that the bottom and top channels are excluded from the calculation of the plots full-scale value.

Automatic Maximum Value

This option searches the histogram for the maximum value and then sets the value found to be the full scale for the histogram.

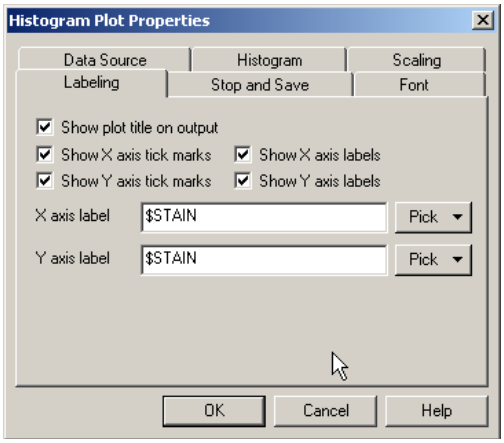
Set Maximum

If the Automatic Maximum Value button is cleared, then any value entered here is the full scale for the histogram.

Histogram Labeling

Use the options here to override the default plot display options for the current plot. This is useful when capturing images for publication.

Show Plot Title on Output
Show Axis Tick Marks
Show Axis Labels
X and Y Axis Labels



Contour Plot

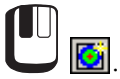
The Contour Plot feature is not available in MXP Software.

Density Plot

The Density Plot option provides two-parameter data display, any combination of parameters can be selected. Each colored area in a Density Plot represents an ISO-count of the number of events (cells or particles). The color shows the number of events at any X and Y parameter value.

To create a Density Plot:

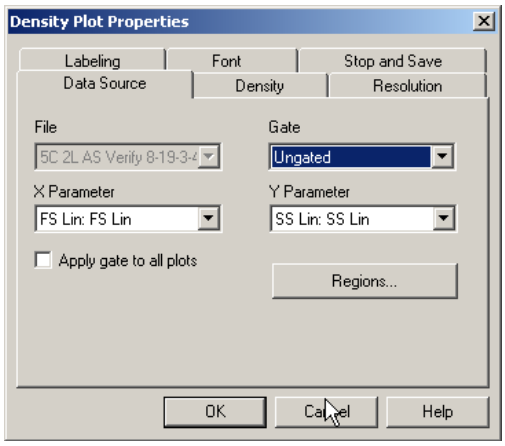
---

1  .

---

2 From the Data Source dialog box displayed, select the required File, then select desired Gates, Parameters and Regions for display.

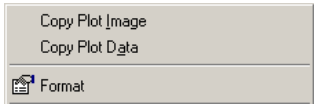
Density Plot Data Source
Density Level Configuration
Density Plot Resolution
Density Plot Labeling
Stop and Save (acquisition only)



---

3 When a Plot is displayed, click the right mouse button to display further menu options.

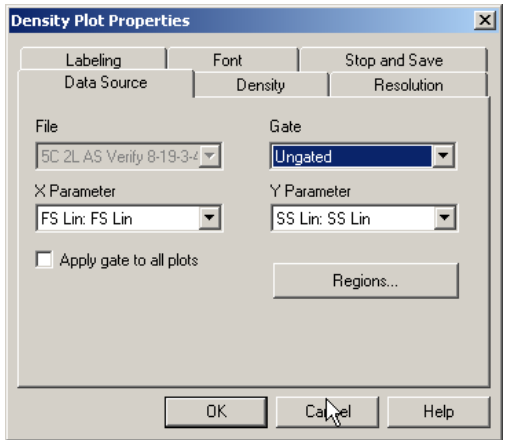
Copy Plot Image
Copy Plot Data
Format Plot



Density Plot Data Source

Choose the X and Y parameters for the current plot. Gating equation and regions to be displayed can be selected.

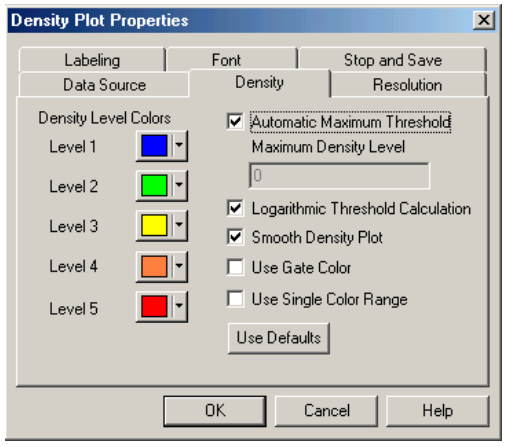
File
Gate Selection
X and Y Parameter
Apply Gate to All Plots
Regions



Density Level Configuration

Use this option to specify the Density levels and other configuration preferences.

Density Level Colors
Automatic Maximum Threshold
Maximum Density Level
Logarithmic Threshold Calculation
Smooth Density Plot
Use Gate Color
Use Single Color Range



Density Level Colors

This Plot may have up to 5 different ISO-count levels, each of which is represented by a color. Choosing the appropriate button may change the default color for each level.

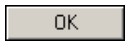
---

1  the Level 1 button to view the Color dialog box.

---

2 Select the desired color that is to be allocated to Level 1.

---

3 Continue as above until all desired changes have been made.   to accept all changes.

  or press Esc to exit the dialog box without saving the changes.

Automatic Maximum Threshold

This option allows automatic configuration of the maximum value that is used to calculate the Density Color Levels. If this option is not selected you may manually enter the value which is used to calculate the Density Color Levels.

Maximum Density Level

Configure the Density Plot to manually enter the value that is used to calculate the Density Color Levels. This option is only active when the **Automatic Maximum Threshold** button is cleared.

Logarithmic Threshold Calculation

Density color thresholds may be calculated in one of two ways:

- Linear threshold calculation - option toggled off
  The maximum value is used to determine the threshold value for each color. The actual threshold value is calculated as follows: -

  Value = (Level No) x (Maximum In Plot /5) - 1
- Logarithmic threshold calculation - option toggled on
  The maximum value is used to determine the threshold value for each color. The actual threshold value is calculated as follows: -

  Value = 10(Level No) x (log10 (Maximum In Plot /5)) - 1

Smooth Density Plot

Choose this option to smooth the Density plot. Clear it to display raw unsmoothed data.

Use Gate Color

Creates a single color density range based on the currently assigned gate color.

Use Single Color Range

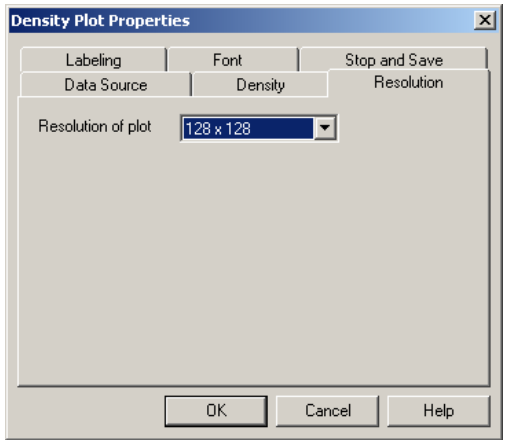
Creates a range of density level colors based on the selected Level 1 and Level 5 colors.

Density Plot Resolution

Set the number of channels for the X and Y Axis of the Plot.

The available options allow for 64, 128, 256 and 512 channels to be displayed on the axis.

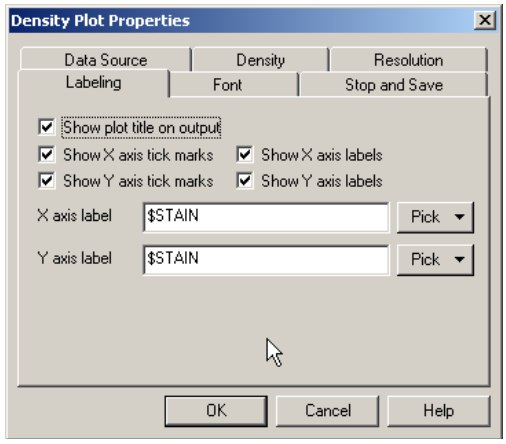
A higher resolution gives an improved graphic image whereas a lower resolution allows faster redrawing of that image.



Density Plot Labeling

Use the options here to override the default plot display options for the current plot. This is useful when capturing images for publication.

Show Plot Title on Output
Show Axis Tick Marks
Show Axis Labels
X and Y Axis Labels



Overlay Histogram Plots

The Overlay Plot feature is not available in MXP Software.

Tomogram Plot

The Tomogram Plot feature is not available in MXP Software.

Surface Plot

The Surface Plot feature is not available in MXP Software.

Prism Plot

A Prism Plot is a way of displaying all the subpopulations or phenotype percentages of a multi-color immunocytometry analysis protocol.

The Plot represents the relative percentages of each subpopulation (phenotype) and the number of phenotypes depends on the number of color parameters being simultaneously analyzed. Prism Plots can be customized, for example: Gate for Prism, Scaling, and so on.

To create a Prism plot:

---

1  .

---

2 An empty Prism plot window is displayed with the Data Source dialog box overlaying it.

---

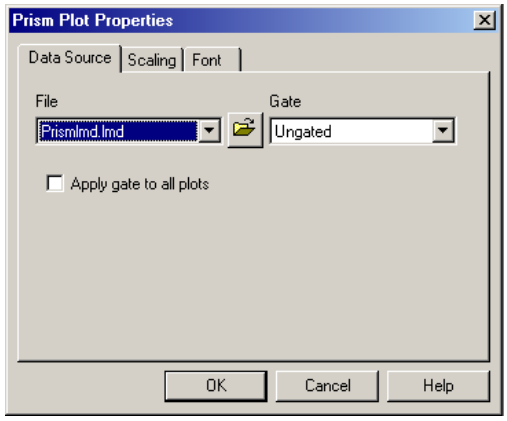
3 Make the desired selections.
Data Source (Prism)
Prism Scaling Control
Format Plot

The plot type with the current Gate is displayed in the plot window. Ungated is the default.

Data Source (Prism)

Choose the **File** and **Gate** to be used for the Prism plot.

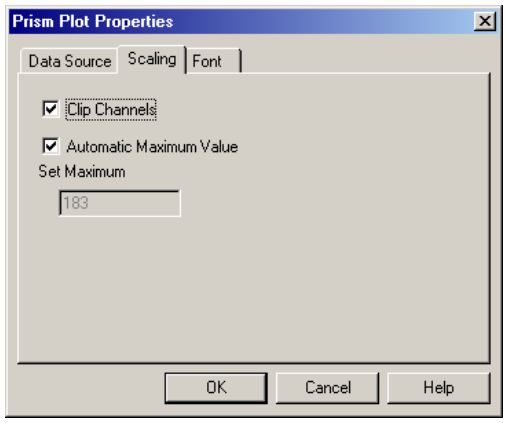
File
Browse Button
Gate Selection
Apply Gate to All Plots



Prism Scaling Control

Use this option to set the Prism plot scaling.

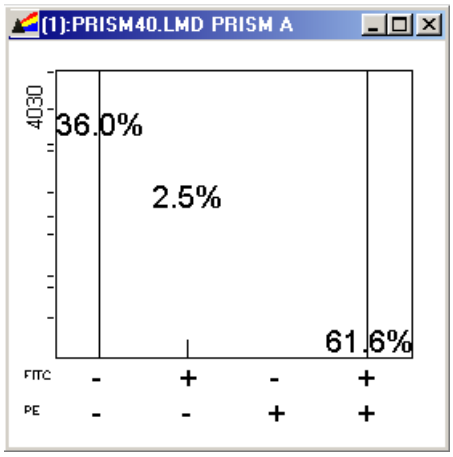
Clip Channels
Automatic Maximum Value
Set Maximum



What is Prism?

Prism is a method of summarizing multi-parameter surface marker data as a one-dimensional Prism plot representing all possible subpopulations or phenotypes.

The Prism plot is a simple bar graph. The height of each bar represents the count of each phenotype. The count as a percentage of all events or gated events is written adjacent or above each bar. The prism plot can be gated, in which case the % values represent the percentage of gated prism events and the gate is indicated in the title bar.

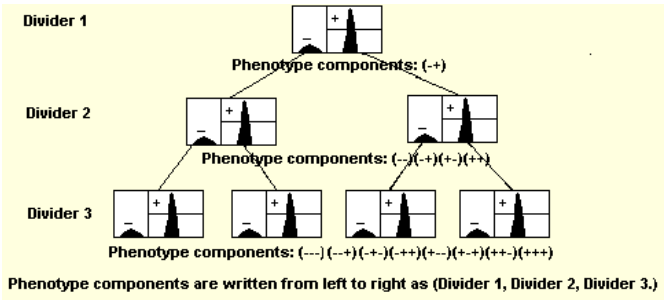


How is Prism Created?

In single parameter analysis of surface marker data, one or two regions are normally set to measure both Negative and Positive cells. We can then look at a second parameter and calculate the 2 phenotypes from parameter-1 positive populations and the two phenotypes from parameter-1 negative populations (four phenotypes in total).

We can repeat this with 3, 4 or more parameters.

The Prism Divider can be used instead to mark the dividing line between the Negative and Positive cells.



Prism Dividers

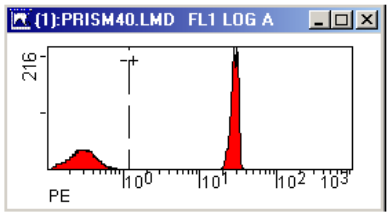
A Prism is created by setting one or more prism dividers. There are three ways of setting prism dividers, two of them involve graphical positioning (single and dual prism dividers). The third uses **Analysis ▸▸ View/Modify Prism** that can set the divider numerically on any divider. Any changes to the divider on one plot is replicated on any other plot using that parameter.

Each new parameter that has a prism divider set on it multiplies the total number of phenotypes by 2.

Only one divider can be set per parameter.

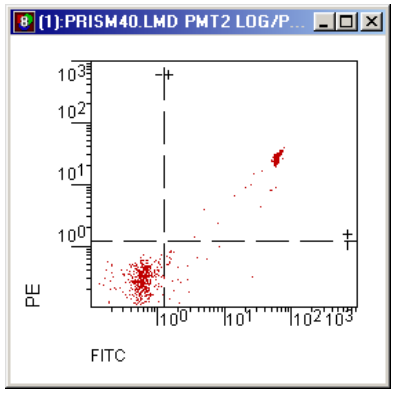
Setting a Single-Parameter Prism Divider

Single parameter prism dividers are set by placing a Single-parameter histogram in focus and selecting . The divider can then be set by clicking on the selected plot, positioning the divider, and then clicking once more to fix the divider position.



Dual Parameter Prism

Dual parameter prism dividers are set by placing a Dual-parameter plot in focus and selecting . This simultaneously creates two prism dividers.



The combinations of dividers are combined to produce 2^p regions
Where p is the number of prism dividers set.

$$2^p \text{ regions}$$

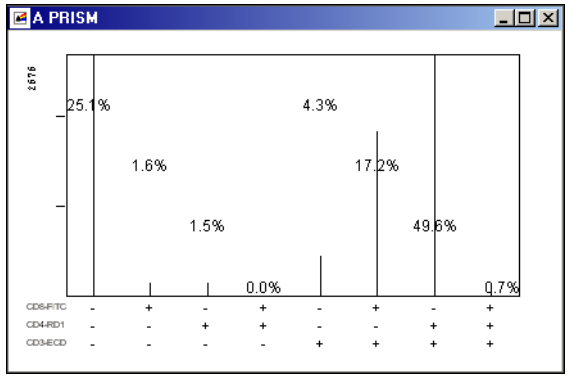
This table shows the number of phenotypes created for up to six Prism dividers set.

Number of Prism Dividers set	Number of phenotypes created
1	2
2	4
3	8
4	16
5	32
6	64

This Plot shows a 3 color Prism Plot (3 dividers set, 8 phenotypes created).
The percentages printed on the prism plot from left to right match one-to-one with the phenotype nomenclature indicated on the axes.
Example:

Triple Positive phenotype (+ + +) is 0.7%.
Triple Negative phenotype (- - -) is 25.1%

The phenotype percentages are staggered to prevent excessive obscuration of the numerical values when a high density of prism information is presented.



Editing Prism Dividers

1 Mouse over the divider to get the ↔ cursor.

2 and drag the divider to the new position.

Removing Prism Dividers

1  the Prism divider you want to delete.

2 ***Press*** Delete.

MXP Software - Prism Compatibility

Note: Reanalysis of listmode files overrides the analysis protocol's Prism dividers. You have to adjust the dividers when this occurs.

Third party software may not display Prism data correctly since a special Prism data display algorithm is involved to display Prism in MXP software.

Legend

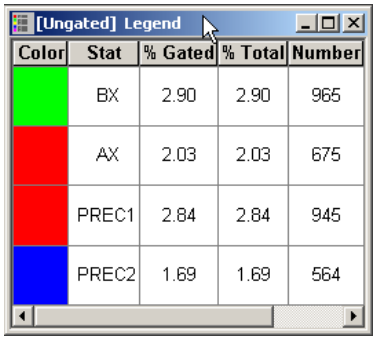
Use this option to view the population colors, population names, and FCS Header sample information.

Note: The Amplifier Gain field is no longer available at this screen if you adjusted the compensation of a Listmode file using the LMD QuickCOMP tool. The original stored file remains unchanged and contains the Amplifier Gain information.

---

1 **Plots ▸▸ Legend Plot** to create a legend plot.
When a Plot is displayed, click the right mouse button within the plot to display further menu options.

Every time the population names or colors are edited MXP software updates the Legend Window.
If MXP software is in Dot Plot Mode-Color Blend mode, Legend will display the names, colors and associated statistics of the color Gate combinations.



---

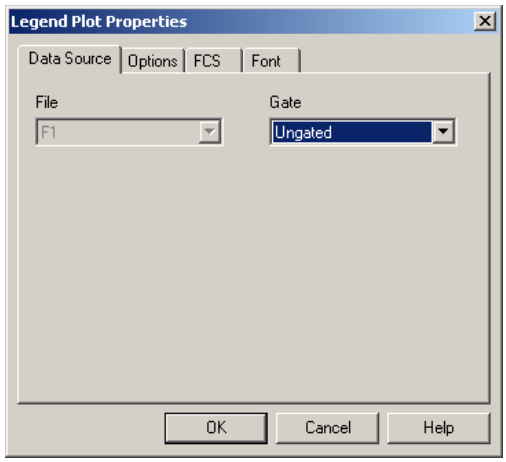
2 If MXP software is in Dot Plot Mode-Color Precedence mode, Legend displays the names, colors and associated statistics of the Gates with the highest precedence at the top.
Note: When analyzing multiple files using Color Precedence, the Legend plot shows all gates from all plots, regardless of precedence and file. To change this so that the Legend shows only those gates and plots associated with a given file, use the Advanced Precedence tab on the Color Precedence edit dialog.

See also:
Data Source (Legend)
Legend - Options Tab
Legend - FCS Tab
Color Blend Mode - Introduction
Modify Color Precedence

Data Source (Legend)

Choose the **File** and **Gate** to be used for the Legend plot.

File
Browse Button
Gate

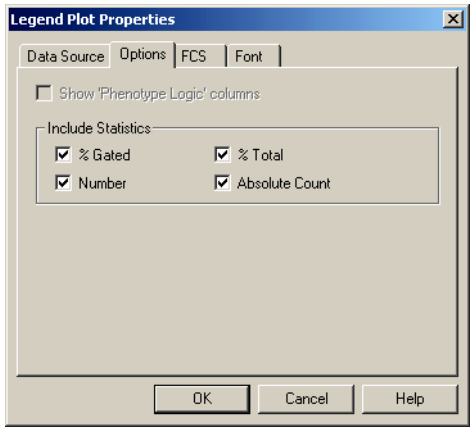


See also:
Legend
Data Source (Legend)
Legend - Options Tab
Legend - FCS Tab
Format Plot

Legend - Options Tab

The Options tab displays various checkboxes that may be enabled as appropriate.

Show "Phenotype Logic" Columns
% Gated
% Total
Number
Absolute Count



See also:
Legend
Data Source (Legend)
Legend - FCS Tab
Format Plot

Show "Phenotype Logic" Columns

Displays the logical combination of Color Gates for each population. Available in Color Blend Mode only.

% Gated

Total number of events in region, as a percentage of events in a gated display.

% Total

Total number of events in region as a percentage of total events in the file.

Number

Total number of events in a Region.

Absolute Count

This displays the absolute count of a population based on the calibration factor (CAL Factor) and the number of particles within a defined CAL region.

Legend - FCS Tab

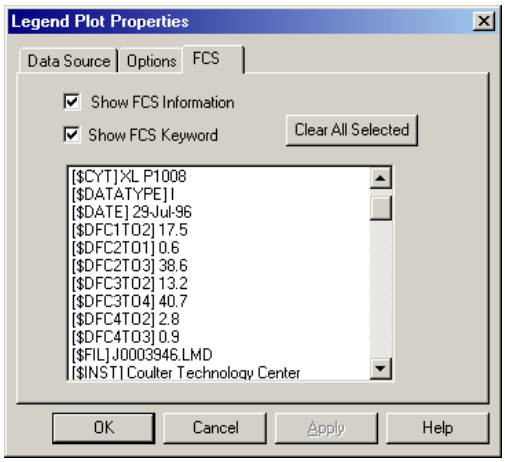
Shows FCS information – Enable this checkbox to allow the display of sample information stores as part of the FCS header.

Show FCS Keyword – Enable this checkbox to display the FCS Keyword as well as the associated keyword value.

Multiple Keywords can be selected from the scroll box.

Select **Clear All Selected** to deselect the items.

Note: Information is displayed in the FCS dialog box only when a valid FCS listmode file is open, or has just been acquired.



See also:
Legend
Data Source (Legend)
Legend - Options Tab
Format Plot

Acquisition Stop and Save

Use Acquisition Stop and Save to terminate the acquisition of a sample at a preset stop value. If there is more than one stop value set, then the first stop counter reached terminates the current acquisition.

> **Note:** The values set in the Cytometer Control Acquisition Limits (duration and Max events) overrides the stop values set here in the event of an acquisition limit being reached before the Acquisition Stop value has been achieved.

Single Parameter Histograms can be selected for automatic saving in FCS Format.

> **Note:** An acquisition from a tissue culture sample is to be stopped on 5,000 cells to allow the collection and storage of all event data.
>
> In a tissue culture sample with two cell types, where cell type A accounts for about 30% of the white cell count, we have no problem with the above setup.
>
> If the sample is from a drug treatment protocol, this could be a problem. A 5,000 cell type A count may not be achieved before the sample well or tube is empty or RAM memory is full.
>
> It is normal under these circumstances to set two counters, one for the stop count and one for the maximum permissible count, that is, the maximum total event count. If a stop count is used, it is recommended that the stop count be set to a large number, for example, 100,000 events. Thus, with a drug treatment protocol, if cell type A is less than 5% of the white cell count, an acquisition would terminate on the total event count of 100,000 before a 5,000 cell cell type A count could be achieved.

Setting a Stop Counter

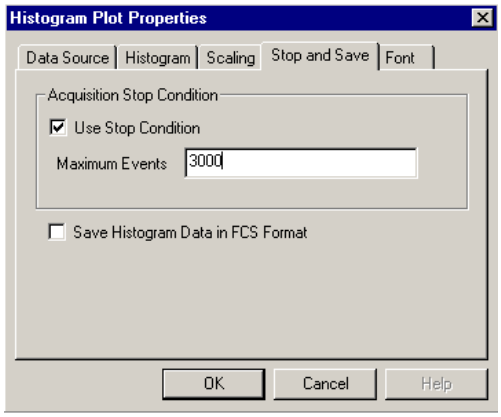
Note: If a stop count is used on a plot that contains an AutoGate region, the stop count is not exact.

---

1 Highlight the plot on which you wish to set a stop counter.

---

2 **Plots ▸▸ Acquisition Save and Stops** command to view the Acquisition Plot Set-up dialog box.
Use Stop Condition
Maximum Events
Save Histogram Data in FCS Format



---

3 **Use Stop Condition** and enter **Maximum Events**.

---

4 To enable an FCS Histogram to be saved from this plot, check the **Save Histogram Data in FCS Format** checkbox.
Note: The actual histogram save action is only performed if the Save Histogram checkbox is checked in Workspace Preferences - Acquisition Options.

See also:
Color Dot Plot
Histogram Plot
Density Plot
Format Plot
Acquisition Stop and Save

Use Stop Condition

Check this checkbox if the stop counter is to be activated.

Maximum Events

Set the maximum number of events you wish to be recorded.

Save Histogram Data in FCS Format

Check this checkbox to save the Histogram Data in FCS Format.

Format Plot

To display the Plot Properties dialog box, click the right mouse button on the plot and



Format options differ depending on the Plot type. Select a formatting option from the table below to view detailed information about the format options available for the different types of plots.

Plot Type	Plot Name	Available Formatting Options
Single Parameter	**Histogram Plot**	Data Source Histogram Scaling Labeling Font Stop & Save
Dual Parameter	**Dot Plot**	Data Source Events Resolution Labeling Font Stop & Save
	Density Plot	Data Source Density Resolution Labeling Font Stop & Save
Special Types	**Legend Plot**	Data Source Options FCS Font
	Prism Plot	Data Source Scaling Font

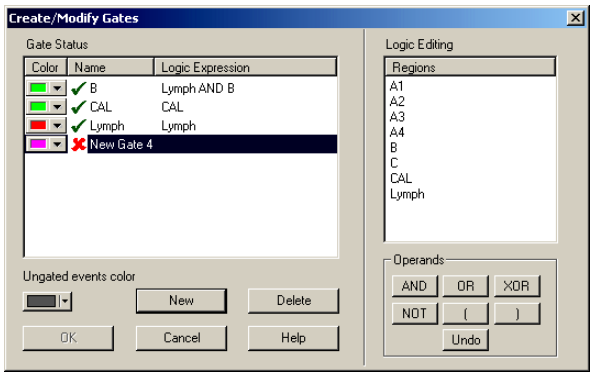
B.20 ANALYSIS MENU

Create / Modify Gates

Use the Gating function to define populations of interest either for plot display or for sorting.

---

1  .



---

2  .

Gate and Logical Expression
Gate Color
New
Delete
Operands

---

3 **New Gate 4** is highlighted so you can modify the name if desired.

---

4 Create new logical expressions.

See also:
Gate Selection
Gate Color
Boolean Gating

Gate and Logical Expression

Shows the Gate name and the logical combination of Gates.

New

Allows you to create a new Gate with a new combination of Regions.

Delete

 erases any selected gates highlighted in the Create/Modify Gates dialog box.

Operands

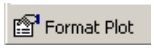
The Operands function allows you to insert a combination of regions into the gating equation using the Operands buttons. Once a Region has been entered next to the new file name, the Operands have to be utilized to enable a new combination of cells to be viewed. The Operands work according to Boolean Gating.

Gate Selection

The Gate option can be used once Gates have been created.

To apply a Gate to a plot:

---

1 Click the right mouse button on the plot and  

.

---

2  the Gate you wish to apply from the **Gate** drop down list box.

---

3  

or press Enter to accept the changes.

or press Esc to exit the dialog box without saving the changes.

Gate Color

When a region is drawn on a plot, the first region is automatically shown as red, meaning events inside this gate are colored red when viewed on a color dot plot. The second is in green, and the third in blue.

These colors can be altered through the Color function if more or different colors are required.

---

1 the down arrow next to the Color Well for the selected Gate or select the Ungated events color down arrow to change the color for Ungated events.

---

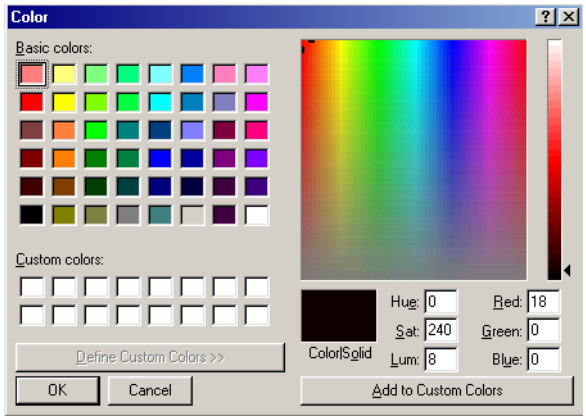
2 the required color.
This automatically changes the events within the gate to this color.



---

3 If further colors are required,

Other to reveal a larger color palette. a defined color or drag the cursor around on the color board to select the color of choice.



4 When the appropriate color has been found, you can click the **Add to Custom Colors** button for easy use at a later date or you can 

to add to a plot.
The same principles can also be applied to the Ungated Events Color option.

Boolean Gating

MXP software implements Boolean gating. Up to eight regions can be combined to form a gate. A gate is used to select a specific subpopulation of data.

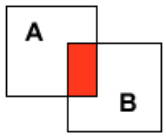
MXP software uses a combination of regions and operators to achieve the Boolean gating process. The Operands are utilized in order to create a combination of regions.

Gate Logic

The shaded areas show the following logical combinations of regions.

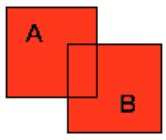
AND

Events which are in both regions A AND region B. This is written as A AND B.



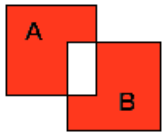
OR

Events that are in region A OR in region B. This is written as A OR B.



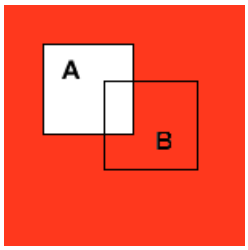
XOR

Events, that are EXCLUSIVELY in region A OR in region B, but NOT in both. This is written as A XOR B.



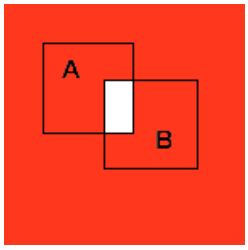
NOT

Events that are NOT in region A. This is written as NOT (A).



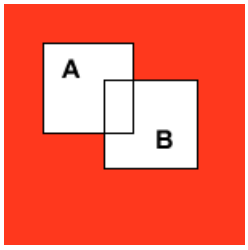
NOT

Events which are NOT in region A AND in region B. This is written as NOT (A AND B).



NOT

Events, which are NOT in region A OR in region B. This is written as NOT (A OR B).



PARENTHESES

[ ]

These are used to define a precise logical statement. An open parentheses must be placed after a NOT operator even if the operand is only a single value.

Example: Lymphs AND NOT (CD8).

Color Blend Mode - Introduction

MXP software allows the use of combinations of Gates to determine the color of dots in a dot plot. The key concept behind this process is similar to color printing and depends upon the use of colored combinations of Gates to define a unique subpopulation. Each Gate (up to three) is given a color and the logical gate combinations give rise to populations with blended colors.

Consider three gates: Gate A, set on FL1 positive cells; Gate B, set on FL2 positive cells; Gate C, set on FL3 positive cells. Any event may be in either none, one, two or all three of these Gates and therefore, combinations of the gates may be used to define eight different subpopulations (phenotypes) of events as follows:

Each of these subpopulations may be represented by a different color. Thus up to eight differently colored subpopulations may be visualized on a Color Gated Dot Plot, and each group can be given a user defined name.

Default Name	Primary A (FL1)	Secondary B (FL2)	Tertiary C (FL3)
Group 0	-	-	-
Group 1	+	-	-
Group 2	-	+	-
Group 3	+	+	-
Group 4	-	-	+
Group 5	+	-	+
Group 6	-	+	+
Group 7	+	+	+

Where: +ve data is inside a Gate, and -ve data is outside a Gate

When in color blend mode ONLY color statistics from the blended colors are displayed in the Legend plot. Use Σ to view Region statistics.

See also:
Modify Color Blend

Modify Color Blend

To use **Modify Color Blend**:

---

1 **Analysis ▸▸ Modify Color Blend** to view the **Modify Color Blend** dialog box.

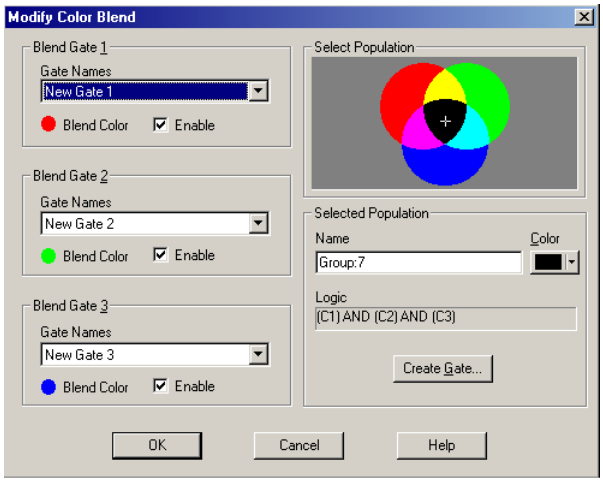
---

2 the Gate you wish to modify.

---

3 Make the desired changes.

Gate Names
Blend Color
Enable
Name
Logic
Color
Create Gate



---

4 OK or press Enter to accept the changes.

Cancel or press Esc to exit the dialog box without saving the changes.

See also:
Create / Modify Gates
Workspace Preferences - Gating

Gate Names
Allows the selection of a Gate that defines a population of interest.

Enable
Enables the selection of one, two or all three blend Gates.

Blend Color
Displays the color to be associated with the selected Gate logic.

Name
Allows a user-defined name for the selected combination.

Color
Allows you to modify the predefined colors.

Logic
Displays the full coloring Gate logic for the selected population.

Create Gate
Creates a logical Gate based on the coloring logic. A Create Gate screen is displayed showing the Gate Logic to be applied. Press **Yes** to Create the Gate or **No** to cancel.

Modify Color Precedence

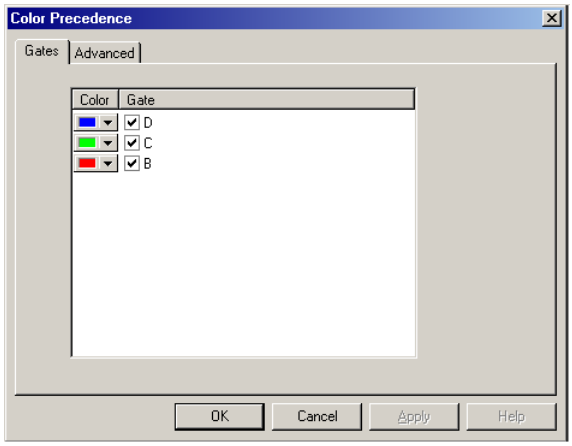
When a subpopulation is very small and a larger blended color would swamp a smaller population, Color Precedence can be used instead of Color Blending. In Color Precedence Mode, the subpopulation (or color) given the highest precedence overrules any color with lower precedence when the same event satisfies more than one color gate, or, when two or more events are to be displayed at the same location.

---

1 **Analysis ▸▸ Modify Color Precedence** to view the Color Precedence – Gates tab dialog box.

---

2 the required gate so as to highlight the gate name ONLY.



---

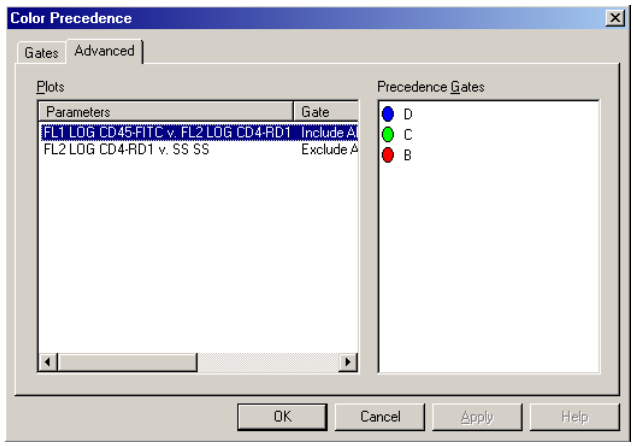
3 Drag and Drop individual Gates into the required order of precedence. Those with the highest precedence are at the top of the list.

See also:
Workspace Preferences - Gating
Advanced Precedence

Advanced Precedence

Advanced Precedence allows you to assign particular Gate colors to specific plots.

This is of particular interest if different plots are gated on completely different criteria and the color from one gate, therefore, has no relevance to another plot or file.



Regions Introduction

A Region identifies a specific population of cells.

Up to 256 regions (total) can be set on any combination of Parameters, 32 of these are usable as Gates.

Regions are drawn on a Single Parameter Histogram by setting the position of an upper and lower boundary (Region markers).

Regions are drawn on a 2-Dimensional Dot Plot by enclosing a subpopulation of events with rectangles, polygons (nonrectangular Regions) or using quadrant markers (four rectangular Regions, set with only one point).

To speed up the analysis of data, when a Single Parameter Histogram Region or a Rectangular or Polygonal Region is created, it is also assigned to a Gate. This assignment can be accepted or edited later. The automatic assignment of Regions to Gate can be switched on or off if desired, using **Gates** ▸▸ Automatic Gate Creation.

Region Properties

on a region to make it active and then click the right mouse button on it to display the Region Properties dialog box. 

.

The **Re-Calculate Autogate** option allows a return to AutoGating after manual manipulation of an Auto region.

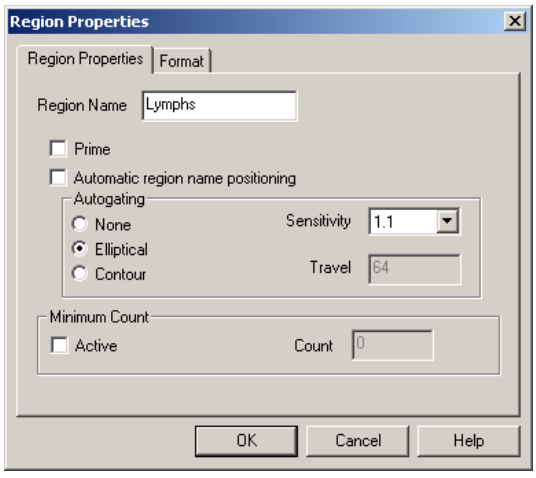
See also:
Linear Region
Linked Marker
Create Multiple Linear Regions
New Non-Linked Marker
Polygonal Region
Quadrant Region
Rectangular Region
Create AutoGate
Linear Region
Create Multiple Linear Regions
Linked Marker
New Non-Linked Marker

Polygonal Region

The Polygonal Region allows you to draw a free-form Region with up to 100 points and can include horizontal acute angles on a dual parameter plot. To draw a Polygonal Region in a dual parameter display see Create Polygonal Regions in the Instructions For Use manual.

Polygonal Region Properties

Region Name
Prime
Automatic Region Name Positioning
None
Elliptical
Contour
Sensitivity
Travel
Interactive Linear Region Editing



Region Name

Displays the name of the region. If the name is not grayed you can rename it.

Prime

When checked, this option allows the system to determine if the peak of the events on the plot is within this region. If the peak is outside this region (due to an air bubble or partial clog), the system performs a Prime cycle. A maximum of three sequential Prime cycles are allowed; if the peak of the plot is still not within this region, the MPL aborts.

Automatic Region Name Positioning

Region labels default to an automatic position. You may move a region label to any desired position within a plot, this user modification automatically unchecks this option. To revert to the automatic position recheck this option.

AutoGating

None

This is the default when the AutoGate option is not selected.

Elliptical

Toggle the AutoGate to an elliptical region.

Contour

Toggle the AutoGate region to a contour region.

Sensitivity

Eliptical AutoGate settings are 0.11, 0.33 and 1.1 (% of processed peak). Contour AutoGate settings are 1, 2, 3, 4, and 5.

- Level 1 = 0.11% processed peak at a resolution of 64x64.
- Levels 2, 3 and 4 = 0.11, 0.33 and 1.1% at a resolution of 128x128.
- Level 5 = 1.1 % processed peak at a resolution of 256x256.

Selecting 0.11 creates a larger region, whereas selecting 1.1 creates a smaller radius region around the target population.

Travel

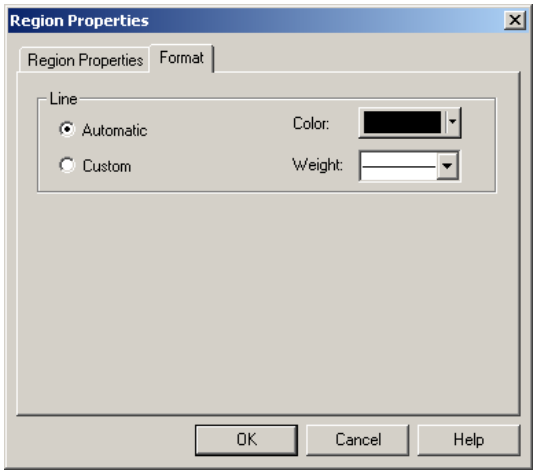
Input a maximum value the contour AutoGate region travels from the mean. The Minimum value is 25; Maximum is 250 channels. Use this option to slightly adjust the AutoGate from sample to sample if slight changes in lysis cause the target population to move slightly. This option is not available for elliptical AutoGates.

Minimum Count

Check this option and enter a number in the **Count** field to enable the minimum count function. This overrides an existing stop count to ensure a minimum number of events within a particular region are collected. The actual stop count in this case is approximate (but is always in excess of the minimum count value). This is limited by the Duration and Total Events.

Polygonal Region Format Tab

Specify the **Color** and line **Weight** for the Polygonal Region boundary.



Interactive Polygonal Region Editing

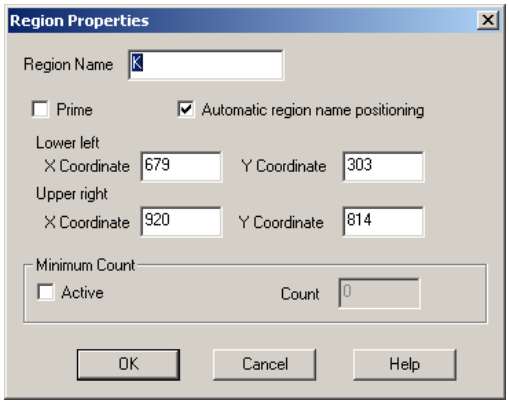
When a Region's position is changed, any Gates and statistics that use the Region are automatically updated and each plot is redrawn to reflect the changes in that Region. When the Region is deleted, any Gate or statistics that used the Region are also automatically deleted. When a Gate has been deleted, any plot that used the deleted gate is reset to Ungated. MXP software allows you to resize an already created Region.

Rectangular Region

This option draws a Rectangular Region on a dual parameter plot. See also: Create Rectangular Regions in the Instructions For Use manual.

Rectangular Region Properties

Region Name
Prime
Automatic Region Name Positioning
X and Y Coordinate
Interactive Linear Region Editing



Interactive Rectangular Region Editing

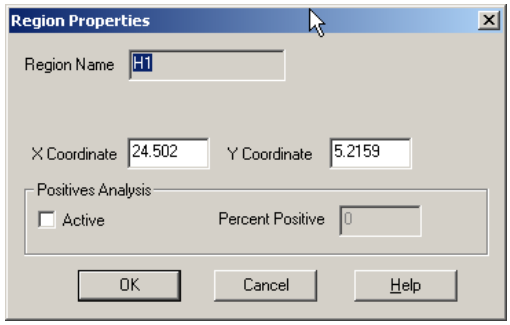
When a Region's position is changed, any Gates and statistics that use the Region are automatically updated and each plot is redrawn to reflect the changes in the Gate. When the Region is deleted, any Gate or statistics that used the Region are also automatically deleted. When a Gate has been deleted, any plot, which used the deleted Gate, is reset to Ungated. MXP software allows resizing of previously created Regions.

Quadrant Region

Inserts a Quadrant Region into a dual parameter plot. All quadrants comprise four sets of Rectangular Regions on a dual parameter plot. The Quadrants are automatically assigned an alphabetical region name and a number for each quadrant. See also: Create Quadrant Regions and Repositioning a Quadrant Region in the Instructions For Use manual.

Quadrant Region Properties

Region Name
X and Y Coordinate
Positives Analysis



X and Y Coordinate

Set the region to defined position by entering X and lower Y coordinates for the region.

Interactive Quadrant Region Editing

When a Region's position is changed any Gates and statistics derived from the Region are automatically updated and each plot is redrawn to reflect the changes in the Gate. When a Region is deleted any Gate or statistics that used the Region are also automatically deleted. When a Gate has been deleted, any plot, which used the deleted Gate, is reset to Ungated. MXP software allows you to reposition an already created Region.

Elliptical AutoGate

Create an Elliptical AutoGate around the selected population on a plot.

See also: Create AutoGate in the Instructions For Use manual.

Contour AutoGate

Create a Contour AutoGate around the selected population on a plot.

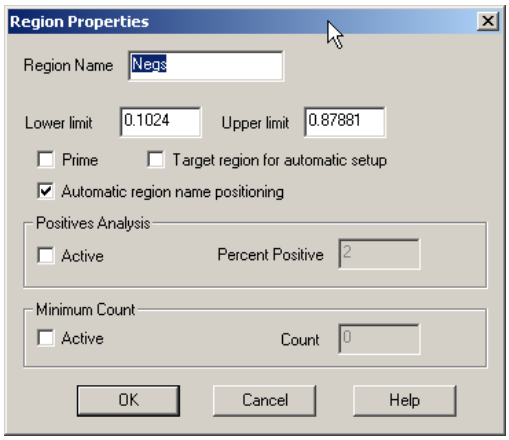
See also: Create AutoGate in the Instructions For Use manual.

Linear Region

Insert a Linear Region. See also: Create Linear Regions in the Instructions For Use manual.

Linear Region Properties

Region Name
Lower Limit and Upper Limit
Prime
Target Region for Automatic Setup
Automatic Region Name Positioning
Positives Analysis
Interactive Linear Region Editing



Lower Limit and Upper Limit

Set the region to defined limits by entering upper and lower limits for the region. These limits can be viewed in the statistics box for each plot by selecting **Analysis** ▸▸ **Select Results** and select **Min/Max**.

Target Region for Automatic Setup

Specify the region as the Flow-Set fluorospheres target region for AutoSetup when multiple regions are present on a FS plot.

Positives Analysis

This option moves the region to the selected percent result. Specify a positive percentage value from 0.1 to 99.9. If the positive analysis option is not selected, the percentile is unavailable. Use this option to automatically set the region position for a negative control sample.

Interactive Linear Region Editing

When a Region's position is changed, any Gates that use the Region are automatically updated and each plot is redrawn to reflect the changes in the Gate. When the Region is deleted any Gate which used the Region is also automatically deleted. When a Gate has been deleted, any plot that used the deleted Gate is reset to Ungated. Allows you to resize an already created Region.

Status Bar (Linear)

The status bar normally gives a brief description of selected menu items.

When drawing or modifying Regions the status bar divides into three areas of information. These update as a region is modified:

- The status bar shows Channel for X parameter
- The total integral count of the region
- The percentage of events currently within the region.

X Coordinate

The X Axis channel value is the coordinate of the cursor position given by a scaling factor. This scaling factor depends on whether the Histogram parameter is using linear or logarithmic amplification and whether you have calibrated that parameter or not.

If the parameter is linear and uncalibrated, the X channel varies between 0 - 255 or 0 - 1024 depending on the data source. If the parameter is logarithmic and uncalibrated, the value varies between 0.1024 - 1024 and span four decades. For most other manufacturers, the data varies between 1 - 10,000, spanning four decades.

Integral

When you create a Region the status bar reflects the integral values given along the scale for that parameter at the cursor position. That is, before the first marker is set.

If the cursor is on channel 10, the integral shows the count value of the populations at channel 10.

After first marker is set and as you move the mouse to either the left or right of this point, the integral value continuously updates to reflect the summation of each channel between the Region starting position and the current mouse position.

Create Multiple Linear Regions

This option sets multiple consecutive linear Regions on one display. See: Create Multiple Linear Regions in the Instructions For Use manual.

Interactive Multi-Linear Region Editing

When a Region's position is changed, any Gates that use the Region are automatically updated and each plot is redrawn to reflect the changes in the Gate. When the Region is deleted any Gate which used the Region is also automatically deleted. When a Gate has been deleted, any plot that used the deleted Gate is reset to Ungated. Allows you to resize an already created Region.

Linked Marker

This feature is not available in MXP software.

New Non-Linked Marker

This feature is not available in MXP software.

View / Modify Regions

Use this option to view/edit a Region's properties, Region points or to delete a Region that is no longer required. Allows you to copy and paste Regions between protocols.

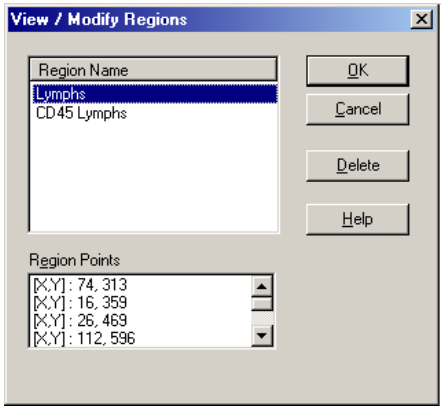
---

1  .

---

2 Make the desired changes.

See also:
Regions
Region Points



---

3  OK or press Enter to accept the changes.

 Cancel or press Esc to exit the dialog box without saving the changes.

See also:
Deleting Regions
Editing and Moving a Region Name
Moving a Region
Resizing a Region

Regions

Select the Region to view, edit, or delete from the Regions list box. Highlight the **Region Name** and  Delete to Delete the region(s). Double click the **Region Name** to rename the region.

Region Points

This list box gives details of the Region bounds. This is Upper/Lower channel for single parameter histograms. For rectangles the lower left and upper right vertices are specified and for polygons the X/Y coordinates of all the vertices. To display a Region's points (or bounds), click on the desired Region in the Regions list box.

Resizing a Region

If you want to enlarge or shrink a Region:

---

1  the Region.

The Region is now active and handles appear. Vertices also appear for Contour Autogate and Polygon Regions.

---

2 Hold the left mouse button down while moving the handle (or moving a vertex using the cross-hair cursor + as in Contour Autogate and Polygon Regions).

Moving a Region

To move a Region to another position:

---

1 Mouse over the Region to get the  cursor.

---

2 Hold the left mouse button down while moving the Region anywhere in the current window. If the Region has been moved, the statistics automatically recalculate. The Region name moves to the same relative position alongside the Region's new position.

See also:
View / Modify Regions

Editing and Moving a Region Name

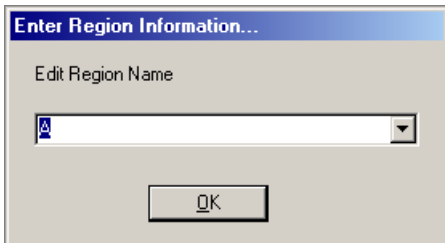
To edit or move the Region name:

---

1 Double click on or near the first letter of the Region name to activate the Region Name dialog box.

---

2 To edit the Region name, type in the desired changes, if any, click OK.



---

3 To move the Region Name, mouse over the region to get the cursor. If the region name has multiple characters, mouse over the first character to get the cursor.

---

4 + hold and drag to move the region name.

---

5 to fix the location of the region name.

Editing a Quadrant Region Name

1 **Analysis ▸▸ View Modify Regions.**

2 on the region name, pause and on the region name again to enter text mode.



3 Type the new name and OK.

Deleting Regions

There are two methods used to delete degions, From Within a Plot and Using the Delete Button in the View / Modify Regions Dialog Box.

Note: If a plot is deleted, its regions are still retained.

From Within a Plot

1 the Region.
The Region is now active and handles appear.

2 Press Delete. The Region is now deleted. Any Gates and statistics that were associated with this Region are also deleted.

Using the Delete Button in the View / Modify Regions Dialog Box

---

1  .

---

2  the Region to delete and  Delete.

Use Ctrl +  to select multiple regions to delete.
Use Ctrl + A to select all of the regions.

---

3  OK or press Enter to delete the Regions.

 Cancel or press Esc to exit the dialog box without deleting any selected Regions.

When you exit the **View / Modify Regions** dialog box, MXP software updates all the Windows. If a deleted Region was also specified in any statistics or Gates, then MXP software updates to reflect these changes.

Re-Calculate All AutoGates

Use this function to re-calculate multiple autogates in a protocol, rather than re-calculating them individually.

Create Prism Divider

Dual Prism Divider

The **Analysis ▸▸ Create Prism Divider ▸▸ Dual Prism Divider** menu option allows you simultaneously set two Prism dividers in a “quadrant fashion" on a dual parameter plot. Any displayed Prism Plot is automatically updated with the new Prism statistics. If the number of Prism dividers is changed during the divider creation, the corresponding Prism plot also reflects this by changing its format according to the number of active Prism dividers.

Note: MXP Cytometer software only allows one Prism divider per parameter and the dividers are GLOBAL across the application. As a consequence, modifying the Prism divider of any parameter on any plot automatically updates the divider of that parameter if it is displayed on any other plot. This includes both dual and single parameter plots.

See also:
Setting a New Dual Prism Divider
Editing a Dual Prism Divider

Setting a New Dual Prism Divider

1 Highlight the chosen dual parameter plot (current window).

2 **Analysis ▸▸ Create Prism Divider ▸▸ Dual Prism Divider**.

3 A Dual Prism cursor is displayed in the current window.

4 Position the cursor anywhere on the window, click to show the prism divider lines. If Esc is pressed at this point the operation is abandoned.

5 Move cursor to position crosshair then click to set position.

Editing a Dual Prism Divider

Editing an existing Dual Parameter plot with a set of dual Prism dividers displayed essentially consists of creating a new set of dual Prism dividers. When the second set of dual Prism dividers is defined the first set is deleted.

---

1 Highlight the required dual parameter plot.

---

2 Mouse over the Prism divider to get the ↔, ↕ or ✥ cursor.

---

3  + hold to set the new Dual Prism crosshair. When the new dividers are set they replace the previously set dividers. Any associated Prism plot is updated with the new Prism statistics.

Any associated Prism plot changes its format and has its statistics updated to reflect a smaller number of Prism dividers and a smaller number of displayed phenotypes.

---

4 To delete Prism divider,  on the divider to make it active and press Delete. The Prism divider for the associated parameter is deleted altogether from this plot and from any other plot that has this divider set. Any associated Prism plot changes its format and has its statistics updated to reflect a smaller number of Prism divider(s).

Single Prism Divider

The **Analysis ▸▸ Create Prism Divider ▸▸** Single Prism Divider menu option allows a single Prism divider to be set on a single parameter plot. Any displayed Prism plots is automatically updated with the current Prism statistics. If the number of Prism dividers is changed during the divider creation, the corresponding Prism plot also reflects this by changing its format according to the number of active Prism dividers. Please refer to your Cytometer system manuals for further explanation on Prism parameter.

Note: MXP Cytometer software only allows one Prism divider per parameter. As a consequence modifying the Prism divider of any parameter on any plot automatically updates the divider of that parameter if it is displayed on any other plot. This includes both single and single parameter plots.

See also:
Setting a New Single Prism Divider
Editing a Single Prism Divider

Setting a New Single Prism Divider

---

1 Highlight the required single parameter plot.

---

2  **Analysis ▸▸ Create Prism Divider ▸▸ Single Prism Divider**.

---

3 A Single Prism cursor  is displayed in the current window.

---

4 Position the cursor anywhere on the window, click to show the prism divider lines. If Esc is pressed at this point the operation is abandoned.

---

5 Move cursor to position crosshair then click to set position.

Editing a Single Prism Divider

Editing an existing Single Parameter plot with a set of single Prism dividers displayed essentially consists of creating a new single Prism dividers. When the second single Prism dividers are defined, the original is deleted.

---

1 Highlight the chosen single parameter plot (click on the title bar).

---

2 Mouse over the Prism divider to get the ↔, ↕ or ✥ cursor.

---

3  + hold to set the new divider. The old divider is deleted and the display is once again updated to show only one single Prism divider. Any associated Prism plot is updated with the new Prism statistics.

---

4 To delete Prism divider,  on the divider to make it active and press Delete. The Prism divider for the associated parameter is deleted altogether from this plot and from any other plot that has this divider set. Any associated Prism plot changse its format and have its statistics updated to reflect a smaller number of Prism dividers.

View/Modify Prism

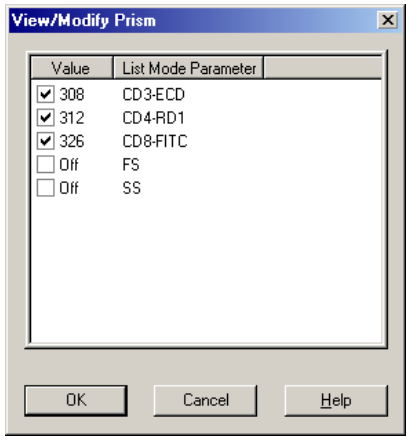
Under most circumstances, Prism is modified graphically by using Dual or Single Prism Divider cursor operations. Occasionally, it is necessary to modify the Prism dividers numerically to reproduce exactly the setup of another experiment. View/Modify Prism allows you to do this.

---

1 **Analysis ▸▸ View/Modify Prism**. The Prism Setup dialog box is displayed.

---

2 the parameter whose divider you wish to edit.



---

3 Place a check in the box next to the Listmode Parameter value you wish to enable.

Note: If no check is in the checkbox, the particular value is automatically set to OFF. This switches off the prism divider and deletes it from any displays that were using it. If a prism divider is switched off, any active prism plots and plots with prism divider displays also update them to reflect the modified number of prism parameters in use.

---

4 the value that you wish to change and enter the required value within the range 0 to 1023.

---

5 OK to accept all changes.

Cancel to abandon all changes.

Select Results

MXP software gives the flexibility of generating many different statistics and these are produced using combinations of Regions and Gates.

A Gate is used to select events that may potentially be counted while Regions mark subpopulations and determine whether an event is actually counted.

All Regions and Gates can be named according to your preference, allowing easy recognition of your results.

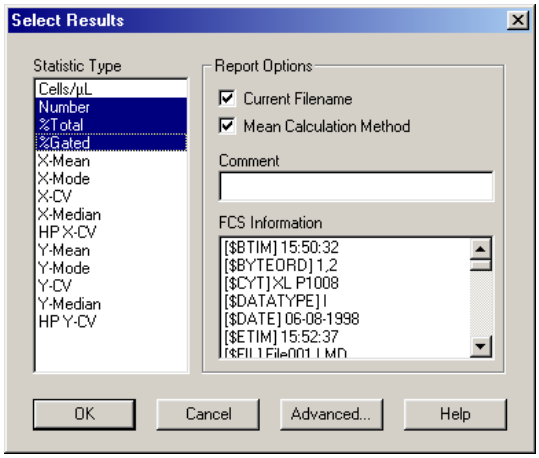
The statistics calculated and displayed depend upon those selected in the current protocol. If no statistics have been selected then the default statistics are displayed. FCS options are either generated automatically by MXP software or obtained from sample information entered by the User. Desired items can be selected and exported during the publishing of an Excel Spreadsheet. The selected FCS information is only published and does not print with the plots within MXP software.

When in Color Blend Mode, only the color blend color statistics from the blended colors are displayed in the Legend plot. Use  to view Region statistics.

Statistic Type

- Number
- % Total
- % Gated
- Percentile
- Mean
- CV
- Median
- HPCV
- Mode
- Cells / µL
- Min and Max

Current File Name
Mean Calculation Method
FCS Information
Advanced Statistics Configuration



For more information concerning the Publication of Results, see Publish Results Now.

Statistic Type

There are the different types of statistics that can be utilized. Any number of these can be selected and the relevant statistic appears in the box beneath the plot.

Current File Name

This option allows you to include the data file name when the results are published to an Excel Spreadsheet. This information is not displayed within the Statistics Window.

Mean Calculation Method

This exports the method of calculating the mean as part of a Published Excel spreadsheet.

FCS Information

These options are either generated automatically by MXP software or obtained from sample information entered by you. Desired items can be selected and exported during the publishing of an Excel Spreadsheet. The selected FCS information is only published and does not print with the plots within MXP software.

Number

Total number of events in a Region.

% Total

Total number of events in region as a percentage of total events in the file.

% Gated

Total number of events in region, as a percentage of events in a gated display.

Percentile

This is the channel, which divides the events in a region by the percentile value. The default percentile is 50 (the median) but this can be set to request any desired value.

Mean

The Mean channel is the arithmetic mean channel defined as the sum of the region channel numbers, times counts, divided by the integral of the region.

The Mean (or the average) is found when all selected events are added together and then divide by the total number of events.

The Advanced button allows for the calculation of a Geometric mean.

CV

The coefficient of variation, or CV, is computed by dividing the standard deviation by the mean of the data between the markers. An accurate CV cannot be computed when there are insufficient events to make the value meaningful. In this case, the result is reported as 0.00 and should not be considered a valid CV measurement. This can happen for all LOG and LIN parameters.

Note: Standard Deviation calculations are only valid between markers that have a Normal or Gaussian distribution. CV is not strictly valid for any other shape distribution. The derivation of CV can be found in any standard statistic text.

Median

Median is used to indicate the point on the scale of measures where the population is centered. The median of a population is the point that divides the distribution of scores in half. Numerically, half of the scores in a population have values that are equal to or larger than the median, and half have values that are equal to or smaller than the median.

HPCV

(HP X-CV and HP Y-CV) The Half Peak Coefficient of Variation (HPCV) is derived by the fixed mathematical relationship between the Standard Deviation (SD) and the Full Width Half Max (FWHM) value of a Normal or Gaussian peak. The relationship between them is defined as SD=FWHM/2.354.

This is an approximation to the real value of CV. The advantage of calculation HPCV is that the value remains fairly independent of the position of a pair of region markers, provided that the markers are set either side of a peak and the marker channel counts are less than half the value of the peak channel count. In general, the HPCV approximation is usually smaller than the CV calculation. See standard statistics texts for further explanation of HPCV and CV differences.

Mode

The mode channel is the channel with the largest number of counts between region markers.

Gate colors can be customized using the drop down color box and selecting the required color.

Cells / µL

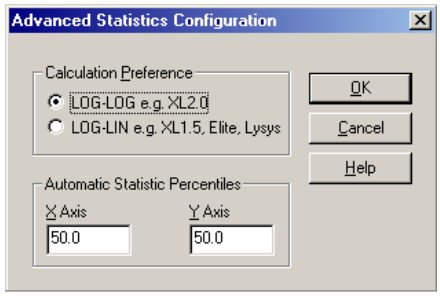
This displays the absolute count of a population based on the calibration factor (CAL Factor) and the number of particles within a user defined CAL region.

Min and Max

Displays linear region boundaries.

Advanced Statistics Configuration

Selecting the Advanced button offers further options to select the way that the mean is calculated.



Log-Log
Log-Lin
Automatic Statistic Percentiles

Differences Between Log-Log and Log-Lin Statistical Calculations

For most practical applications users may never notice the difference between the two. In general, Log-Log mean appears to have its value skewed further to the right than a Log-Lin mean calculation on the same data. This skew is more pronounced when the distribution of data extends greater than ±half a decade from the mean value, however calculated.

Log-Log

Selecting Log-Log calculates the arithmetic mean values of Log data using conversion of each individual channel before a mean value is calculated.

Log-Lin

Selecting the Log-Lin mode calculates the geometric mean values by determining the arithmetic mean of the raw ADC channels and then converting this to its relative linear channel equivalent.

Automatic Statistic Percentiles

This is the channel, which divides the events in a region by the percentile value. The default percentile is 50 (the median) but can be set to request any desired value. Different values may be set for both the X and Y axis.

Absolute Count Calibration

Use absolute count calibration particles for the calculation of absolute numbers of cells present in a sample.

IMPORTANT Ensure at least 1,000 Flow-Count fluorospheres are counted or erroneous results may occur.

As a sample is analyzed, the numbers of a particular cell type in a region, and the numbers of absolute count calibration particles present in a CAL region are compared, and the absolute concentration of the cell type is then calculated automatically.

Note:

- A CAL region MUST be set for the system to be able to calculate an absolute count. See: Setting a CAL Region.
- Listmode replay uses the runtime protocol CAL Factor unless you select a different CAL Factor before replaying the file.
- If the CAL Factor is set to 0 or there is no CAL region present in a protocol that has Cells/µL selected, *Error* appears in the Cells/µL field.

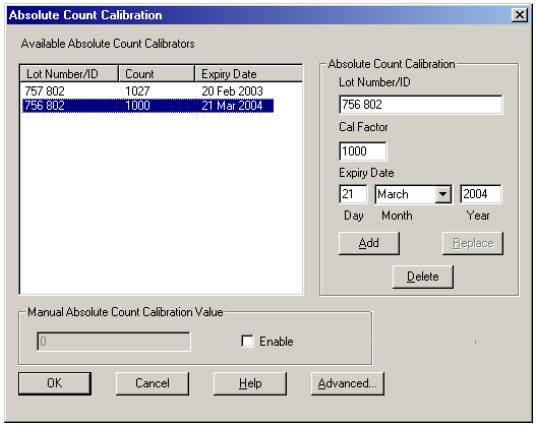
To display the absolute count, **Cells/µL** from the Analysis/Select Results menu option.

Setting a CAL Factor for Absolute Counts

The Absolute Count dialog box allows you to store the absolute count calibration particles Lot Number and Expiration Date information, for reference use only.

Enter the CAL Factor to be used in the Plate Wizard when setting up the Worklist.

Note: The number of events in the CAL region must be greater than 1000; otherwise, absolute counts are not determined.



Advanced Button

If your System Administrator has assigned you access rights, the **Advanced** button is selectable and you can enter and modify batch and count information.

Expiry Date, **Lot Number/ID** and **CAL Factor** can be entered here. **Add** allows the addition of a new Lot. **Replace** allows you to replace the selected information with updated values. **Delete** removes the selected Lot from the list.

Setting a CAL Region

Create a Region around the absolute count calibration particles, the region MUST be named CAL. Set the calibration factor in the Plate Wizard when defining the Worklist.

Calculate Results

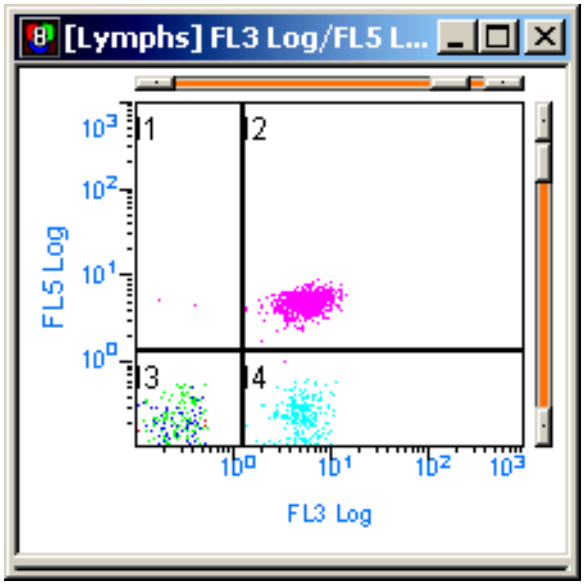
This option calculates the statistics for all files selected on the screen.

LMD QuickCOMP

Enabling LMD QuickCOMP displays orange slider bars on all dual fluorescence plots.

These sliders are used to intuitively adjust the compensation coefficients and update the compensation values in the Cytometer Control Compensation Tab.

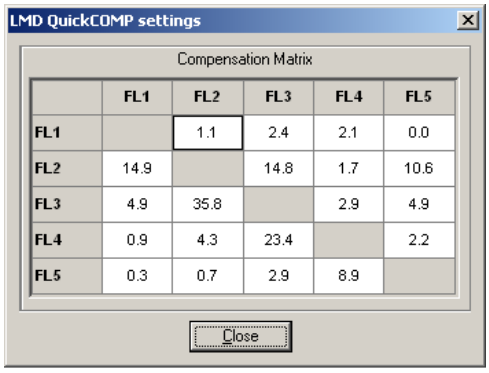
Clicking the arrows adjusts the settings by ±0.1%, clicking either side of the slider adjusts by ±1.0% or drag the slider to place the cells in the required position.



Show LMD QuickCOMP Matrix

When you use the LMD QuickCOMP slider bars to change compensation settings, the new settings are displayed in the LMD QuickCOMP Matrix dialog box. You cannot use the LMD QuickCOMP Matrix to change compensation settings.

Note: To view compensation adjustments of Listmode data, always view the LMD QuickCOMP Matrix. The compensation matrix in the Cytometer Control dialog represents the compensation settings last used in that protocol and may not necessarily be the compensation settings used for any given Listmode file.



B.21 FLOWPAGE MENU

FlowPAGE - Introduction

FlowPAGE is the reporting area for Data, Plots, Statistics, and user created text. FlowPAGE enables custom formatting of multiple pages of flow cytometer information without the need to swap between other third party applications.

The automatic header information appears as XXXXs on the analysis FlowPAGE reports when viewed in the MXP software. These automatic header fields display the Listmode file Keyword information only when the FlowPAGE reports are printed.

Once a FlowPAGE is created, the contents of its plots and statistics windows are automatically updated to reflect new listmode data or configurations made in the MXP software analysis.

Listmode file names can become very long depending upon the naming options you have selected. If these long Listmode file names result in the statistics boxes overlapping, you may need to reformat the FlowPAGE to view all of the results.

All FlowPAGEs are saved with a Protocol, this retains the link between the Plots you display and how you want to format the output to the Printer.

Note: FlowPAGEs are not updated during Data Acquisition in live time. FlowPAGEs are updated at the conclusion of acquisition, or after reading a new data file from disk, or editing Regions, Gates or Statistics or resizing FlowPAGEs.

Note: Occasionally, when using a FlowPAGE, one or more items cannot be deleted from a page. If this occurs, the items can be cleared from the FlowPAGE by selecting **Files ▸▸ Save As…** to save the protocol with a new name. If you reload this new protocol, the items are now cleared from the FlowPAGE.

Editing FlowPAGEs

See also: Creating FlowPAGES in the System Overview chapter in the Instructions For Use manual.

Select a Single Item Within FlowPAGE

1 Mouse over the item until you see the ✥ cursor.

2 🖱 the item and handles appear around the item.

Move a Selected Item Within FlowPAGE

1 Mouse over the item until you see the ✥ cursor and 🖱 +hold and drag the selected item to its new position.

Select a Group of Items Within FlowPAGE

1 Click and hold the mouse button, selecting just outside the group of items required.

2 Drag the cursor until the marquee (dotted outline) completely encompasses the items you want to select.

3 Release the mouse button. Each item has handles around it.

4 Mouse over the selected items til you see the  cursor and  +hold and drag the selected items to move them.

5 Click the right mouse button on the selected items to edit them.

Deleting Objects in FlowPAGE

1  the object that is to be deleted. Handles appear around the object.

2 Press Delete.

Resizing Objects in FlowPAGE

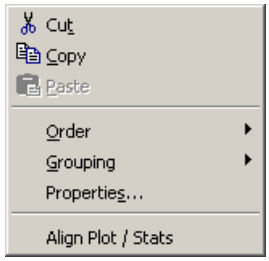
1  the object that is to be resized. Handles appear around the object.

2 Drag a handle to the size required and release the mouse button.

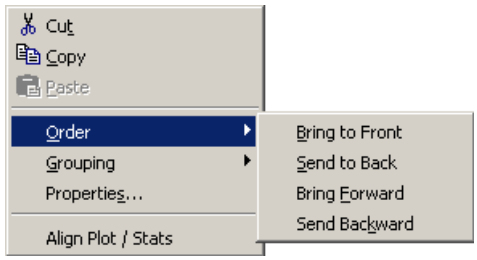
Additional FlowPAGE Formatting Options

Click the right mouse button on any object on the FlowPAGE to select additional formatting options.

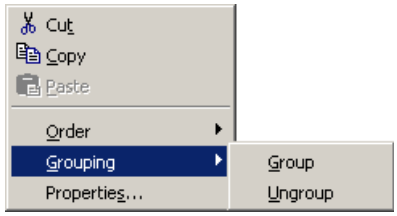
You can **Cut**, **Copy** and **Paste** items that are selected.



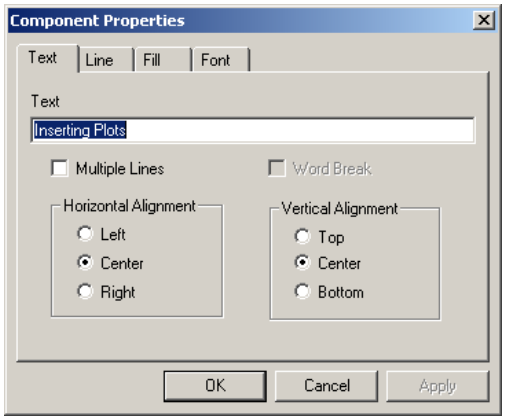
You can change the order of items that are selected.



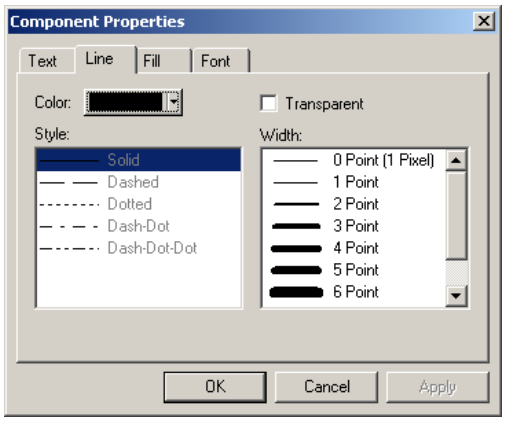
You can group and ungroup items that are selected.



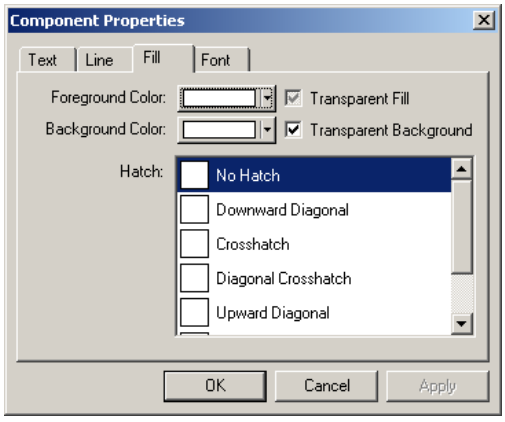
You can edit and change the alignment of text.



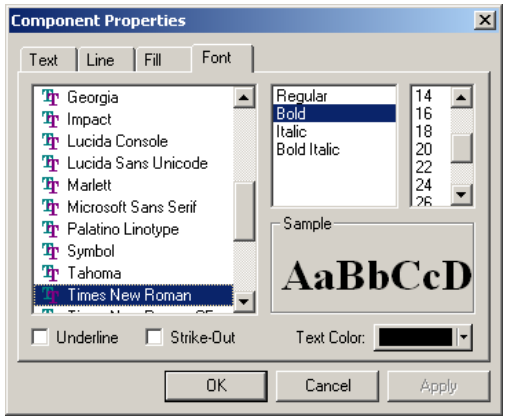
You can change how lines are displayed.



You can change the fill properties of items that are selected.



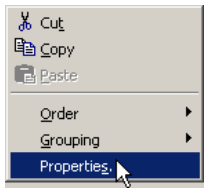
You can change the font properties of items that are selected.



Edit Text

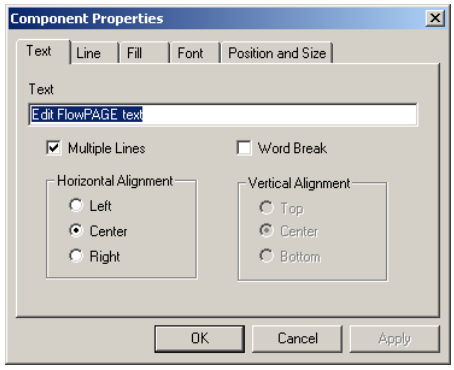
1 Textbox in the FlowPAGE that you wish to edit. The edit handles appear.

2 Right mouse click on the textbox and **Properties.**



3 Type in the new text.

4 OK. See Edit Font (FlowPAGE).



Change Plot

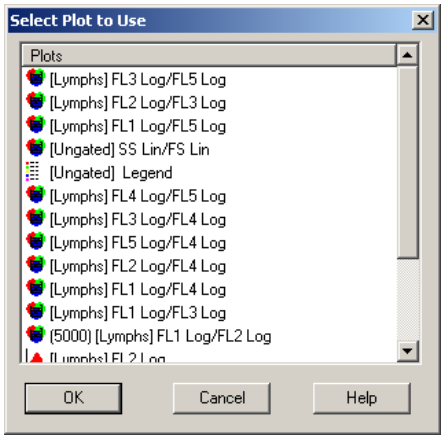
Use Change Plot to change which Plot is displayed from those available on the MXP desktop.

---

1 On the FlowPAGE, the Plot you want to replace. The edit handles appear.

---

2 **FlowPAGE ▸▸ Change Plot**.



---

3 Select the plot you want to use.

---

4 OK.

Grow to Largest

---

1 Select the items to be changed. See Select a Group of Items Within FlowPAGE.

---

2 . All items in the group grows to the size of the item which has the largest area.

Shrink to Smallest

1 Select the items to be changed. See Select a Group of Items Within FlowPAGE.

2 the button. All items in the group shrink to the size of the item which has the smallest area.

Align Left

1 Select the items to be aligned. See Select a Group of Items Within FlowPAGE.

2 . All items are now aligned to the item that was the furthest left in the objects selected.

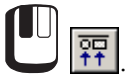
Align Right

1 Select the items you wish to align. See Select a Group of Items Within FlowPAGE.

2 . All items are now aligned to the item that was the furthest right of the objects selected.

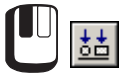
Align Top

1 Select the items to be changed. See Select a Group of Items Within FlowPAGE.

2  . All items are now aligned to the item that was the topmost in the section that was selected.

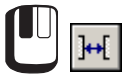
Align Bottom

1 Select the items to be changed. See Select a Group of Items Within FlowPAGE.

2  . All items are now aligned to the item that was nearest the bottom of the objects that were selected.

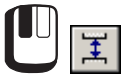
Space Evenly Across

1 Select the items to be changed. See Select a Group of Items Within FlowPAGE.

2  . All items are now horizontally spaced equally.

Space Evenly Down

1 Select the items you wish to change. See Select a Group of Items Within FlowPAGE.

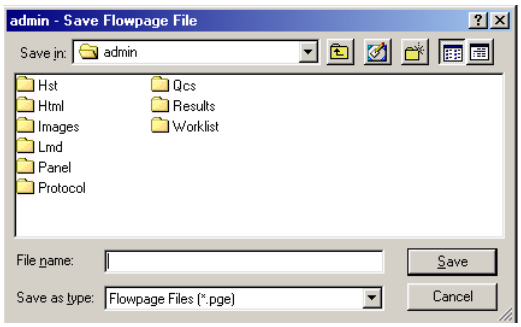
2  . All items are now vertically spaced equally.

Save FlowPAGE As

To save an existing FlowPAGE as a FlowPAGE template:

1 **FlowPAGE ▸▸ Save FlowPAGE As** to view the Save FlowPAGE dialog box.

2 Specify the desired drive and folder by selecting them in the list boxes or by typing the path in the File text box.



3 In the **File name** text box, type the desired File Name.

4 FlowPAGE gives the default file extension *.PGE. The *.PGE extension is only a suggestion, any standard DOS characters can be used for the full file name.

Note: Keep the extension consistent for easy file searches.

B.22 CYTOMETER MENU

The Cytometer menu is concerned with online connection and control of the flow cytometer. The Cytometer Control menu option allows the Cytometer Control screens to be activated. Until this is done the other Cytometer menu items are grayed out.

The Status Page displays current instrument settings, which can be printed out for future reference.

The Cytometer Log displays a log of errors generated by the system.

The Get Cytosettings from Protocol option allows Cytometer Instrument Settings to be obtained from a Protocol other than the current Protocol in memory.

The Get Cytosettings from LMD file option allows Cytometer Instrument Settings to be obtained from a listmode file.

The Controls for Acquisition are also found within the Cytometer menu.

See also:
Flow Rate
Status Bar

Cytometer Control

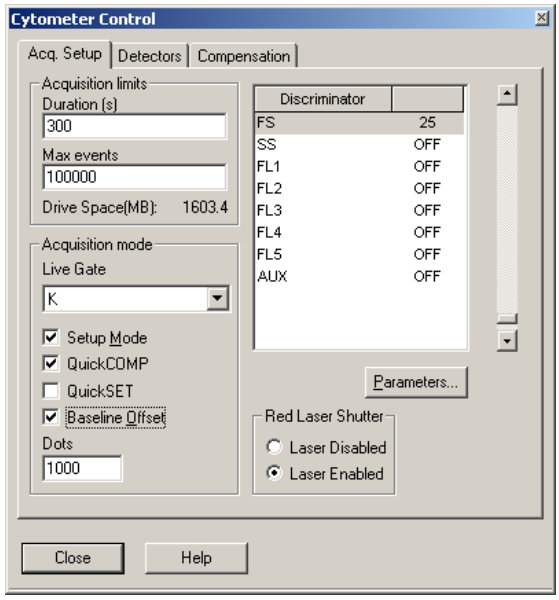
The Cytometer Control button  opens the Cytometer Control screen. This screen is a show/hide dialog box.

See also:
Cytometer Control Acquisition Setup Tab
Cytometer Control Detector Tab
Cytometer Control Compensation Tab
Flow Rate

Cytometer Control Acquisition Setup Tab

This screen is used to set the Acquisition Mode and Acquisition Limits. Additionally, the Discriminator values for the selected Parameters can be set.

Duration (s)
Max Events
Drive Space (MB)
Live Gate
Setup Mode
QuickCOMP Mode
QuickSET Mode
Baseline Offset
Dots
Discriminators
Parameter Button
Red Laser Shutter



See also:

Cytometer Control
Cytometer Control Detector Tab
Cytometer Control Compensation Tab
Cytometer Control Parameter Setup
Flow Rate
Status Page

Duration (s)

Sets the maximum **Duration** of the Acquisition in seconds for each sample. When this time limit has been reached acquisition stops. However, if the maximum number of events is reached before the duration limit, acquisition ceases at this point.

Max Events

This is the maximum number of events, which may be acquired on the next Acquisition. To change this, enter the new number required in the input field. However, if the Duration is reached before the maximum number of events acquisition ceases at this point.

Drive Space (MB)

Shows how much free data storage space is available on the currently selected storage device, in megabytes (MB).

Live Gate

This displays all Gates that are available for the Live Gating of data during acquisition. Data outside the selected gate is not displayed and is NOT STORED to disk to reduce the size of the listmode files by gating out all unnecessary events.

IMPORTANT Improper use of the Live Gate region may generate erroneous but credible results. If a Live Gate region is modified during acquisition, the data set will be a combination of data from the original and the modifed gate positions. If this is not desired, then a Restart must be invoked manually.

To avoid capturing a mixed set of data when using the Live Gate region:

- Ensure that the Live Gate is correctly positioned on the populations of interest prior to the acquisition of data. Do not make changes to the Live Gate region or assignment during acquisition.
- Make changes to Live Gate regions only after activating the **Setup Mode** option in the Cytometer Control screen resulting in a refresh of the data. If the MXP software is not in Setup Mode when changes are made to a Live Gate region, a manual Restart is required.

Review all data plots and results prior to reporting results.

Setup Mode

Enable this checkbox to allow the continuous acquisition of data from the Cytometer. In this mode, Stops are disabled and listmode files are not stored.

Setup Mode allows continuous acquisition of data from the Cytometer giving continuous real-time feedback of instrument performance on the displayed plots. Any Stop & Save values set are ignored in this mode.

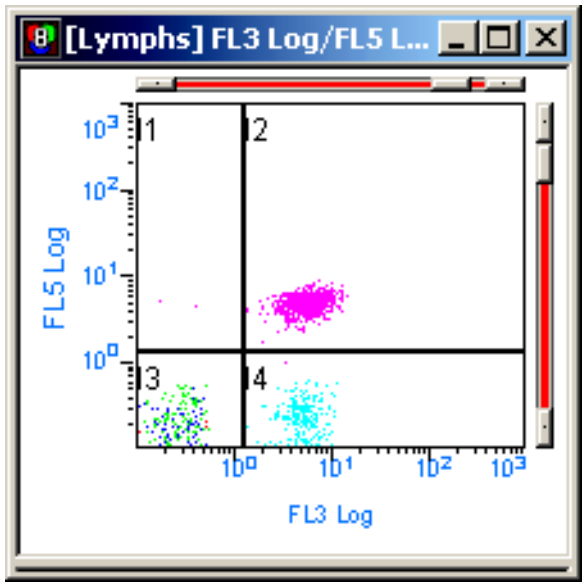
Display of data continues until **Abort** is selected, to end data acquisition, or the **Setup Mode** box is unchecked, to begin normal data acquisition.

In Setup Mode the plots are updated live time with only the most recently acquired events displayed. The incoming data is not saved. During Setup Mode, older events are cleared from the screen and from memory allowing the Cytometer settings to be adjusted in real-time without reaching a set stop condition.

Data is displayed on a “first in; first out” basis. The number of events to be displayed can be changed by entering the required value into the Dots input box.

Once you have finished using Setup Mode click **Abort**, or uncheck the **Setup Mode** checkbox and then perform the acquisition.

QuickCOMP Mode



Enabling **QuickCOMP** on the Cytometer Control Acquisition Setup Tab dialog box displays red slider bars on all dual fluorescence plots.

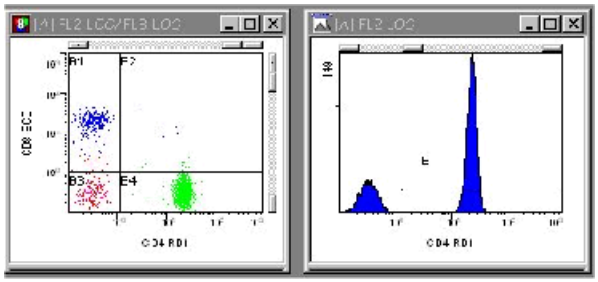
These sliders are used to intuitively adjust the compensation coefficients and update the compensation values in the Cytometer Control Compensation Tab.

Clicking the arrows adjusts the settings by ±0.1%, clicking either side of the slider adjusts by ±1.0% or drag the slider to place the cells in the required position.

When **QuickCOMP** is enabled **QuickSET** mode is not available.

Note: Listmode Compensation must be performed using the runtime protocol or a protocol with equivalent parameters as the runtime protocol.

QuickSET Mode



Enabling **QuickSET** on the Cytometer Control Acquisition Setup Tab dialog box displays slider bars on all plots.

These sliders are used to adjust voltages at the data plots and update the high voltages in the Cytometer Control Detector Tab.

Clicking the arrows adjusts the voltage; clicking either side of the slider adjusts the voltage by a higher increment. Or, drag the slider to place the cells in the required position.

When **QuickCOMP** is enabled **QuickSET** mode is not available.

Baseline Offset

Enable this checkbox to switch on Baseline Offset. Further information concerning the setting of this option can be found under Workspace Preferences - Plot Display.

Dots

This sets the maximum events to be displayed during **Setup Mode**. The default size is 1,000 events. The **Setup Mode** rolling displays are updated up to three times per second from this buffer. To change the size, edit the Dots field to the number of Dots required. If a zero is entered, an error message displays showing range of 10 - 9999. The Dots value is stored in the Protocol.

Discriminators

Lists the currently selected parameter and allows the setting and modification of discriminator values. To change a value, select the discriminator you wish to alter and use the Slide Control on the right hand part of the display to change the value as appropriate.

Parameter Button

Selecting this displays the Setup Parameter Screen.

Red Laser Shutter

Use to enable or disable the red laser. The shutter setting is passed as part of the instrument settings part of the protocol.

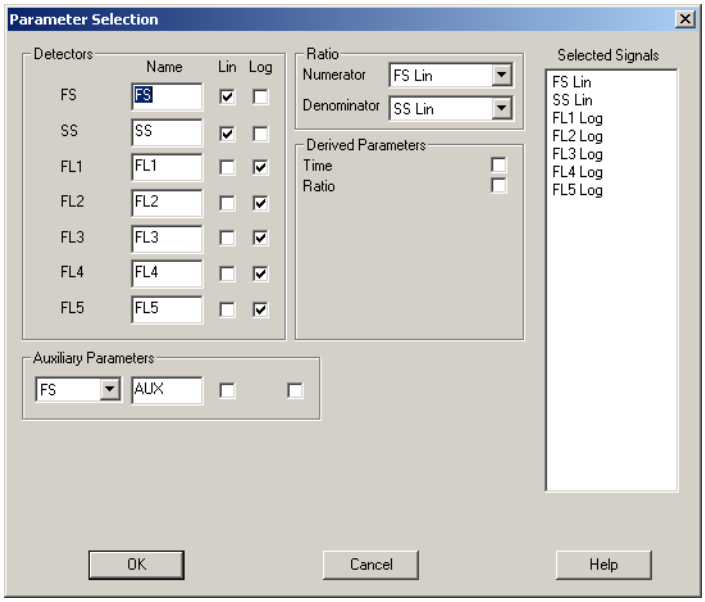
Cytometer Control Parameter Setup

This screen is used to select the Signals required in the Parameter Setup.

The signals that are available are selectable by checking the options you require.

Note: If you add a parameter to an existing protocol, the Detector names revert to the default names shown below.

IMPORTANT Risk of erroneous results if you assign the same parameter name to more than one detector. Use a different parameter name for each detector.



You can arrange the order within the **Selected Signals** list box by highlighting the appropriate item(s) and Drag and Drop into your chosen order within the **Selected Signals** list box.

To remove a previously selected item from the **Selected Signals** box, uncheck the parameter no longer required.

Ratio and **Time** cannot be reordered and always appear at the bottom of the list.

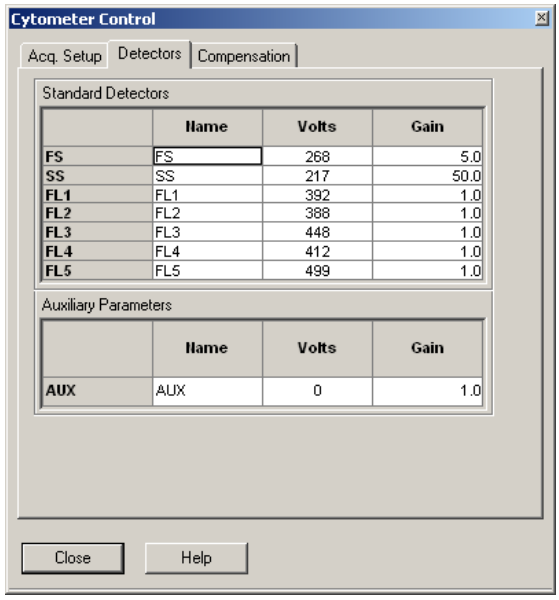
Ratio – Choose from the drop down box the appropriate option for the Numerator and Denominator if required.

A detector name may be entered, this is displayed in all **Cytometer Control** screens but does not appear on plots.

Cytometer Control Detector Tab

This shows the detectors with editable names and detector settings. Changes made here are only reflected in the **Cytometer Control** dialog box and are used to identify the various fluorochromes in use. Reagent or sample specific information should not be entered in this menu. See **View ▸▸ Acquisition Manager ▸▸ Parameter Names** or **File ▸▸** Edit FCS Header Attributes**.**

Name
Volts
Gain
AUX



See also:
Cytometer Control
Cytometer Control Acquisition Setup Tab
Cytometer Control Compensation Tab
Cytometer Control Parameter Setup

Name

These input fields allow the editing of the Names assigned to the default manufacturer's detectors. Changes are ONLY reflected in the names shown within the Discriminator box in the Acquisition Setup tab and the Compensation tab. This allows the various fluorochromes to be easily recognized when adjusting instrument settings.

Volts

Select the appropriate Voltage for the particular Detector. This is done by using the Slide Bar on the right side of the screen and adjusting it to the required value. For fine adjustment, the Up and Down arrows at the ends of the Slide Bar can be used.

Gain

Adjusts the Gain amplifier. Set the Gain to the appropriate setting you require for that Detector. This is chosen from the drop down box, which appears when you click in the box.

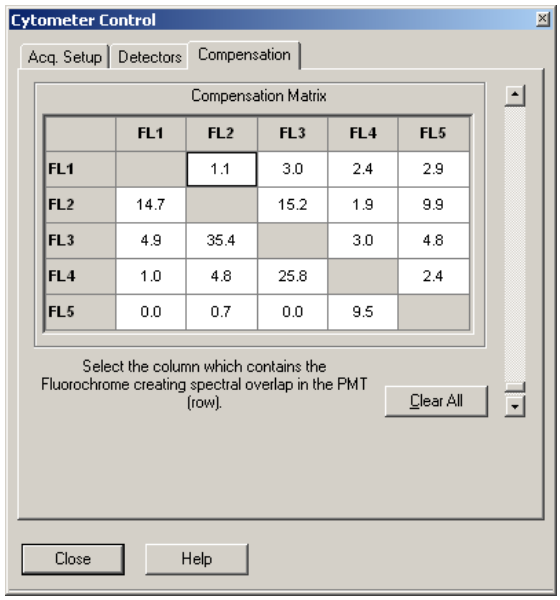
AUX

Displays the signal source for the Auxiliary Parameter channel.

Cytometer Control Compensation Tab

Compensation allows for the subtraction of a percentage of the signal of one fluorescence detector from the signal of another fluorescence detector to correct for the overlap of one dye's emission into another dye's detector.

Compensation Matrix
Clear All Button



See also:
Cytometer Control
Cytometer Control Acquisition Setup Tab
Cytometer Control Detector Tab

Compensation Matrix

Click in the box and type a value or use the Slide Bar to set the desired value. Use the Up and Down arrows to make any fine adjustments to the value.

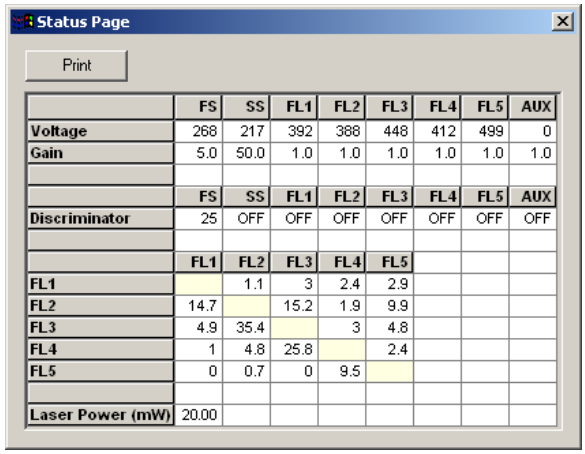
Clear All Button

Selecting the **Clear All** button resets ALL the values within the **Compensation Matrix** to zero.

Status Page

The **Status Page** displays the Cytometer settings currently in use and allows you to print these if required.

Selecting the **Print** button displays the standard Windows Print dialog box.



	FS	SS	FL1	FL2	FL3	FL4	FL5	AUX
Voltage	268	217	392	388	448	412	499	0
Gain	5.0	50.0	1.0	1.0	1.0	1.0	1.0	1.0

	FS	SS	FL1	FL2	FL3	FL4	FL5	AUX
Discriminator	25	OFF	OFF	OFF	OFF	OFF	OFF	OFF

	FL1	FL2	FL3	FL4	FL5
FL1		1.1	3	2.4	2.9
FL2	14.7		15.2	1.9	9.9
FL3	4.9	35.4		3	4.8
FL4	1	4.8	25.8		2.4
FL5	0	0.7	0	9.5	

Laser Power (mW)	20.00

Cytometer Log

Use this menu item to view the log of errors generated by the system. It also allows you to clear this log as needed.

Get Cytosettings from Protocol

The **Get Cytosettings From Protocol** feature allows Cytometer Instrument Settings to be obtained from a Protocol other than the current Protocol in memory.

Cytometer ▸▸ Get Cytosettings From Protocol File and follow the instructions to open a protocol file in the heading Open Protocol. Use the appropriate procedure depending on whether you have the standard MXP software or also have the 21 CFR Part 11 option installed on your system.

Get Cytosettings from LMD file

The **Get Cytosettings From LMD File** option allows Cytometer Instrument Settings to be obtained from a listmode file.

Cytometer ▸▸ Get Cytosettings From LMD File and follow the instructions to open a listmode file in the heading Open Listmode File. Use the appropriate procedure depending on whether you have the standard MXP software or also have the 21 CFR Part 11 option installed on your system.

Start

The Start button initiates acquisition of the current sample.

Stop

The Stop button ■ ends data acquisition. Any Output options such as saving data, calculating statistics, printing reports, and so on, are then performed.

Abort

Selecting the Abort button ✖ displays the Abort screen. This function is only available if Acquisition is running.

Note: No Files are saved if a sample is Aborted.

Select the option required and OK.

Abort the Well?
Abort the Panel?
Abort the Plate?
Repeat the Well?
Repeat the Panel?



Abort the Well?

Stops acquisition and marks the current sample as aborted. The instrument proceeds to the next sample.

Abort the Panel?

Stops acquisition and marks the remainder of the current panel as aborted. The instrument proceeds to the first sample of the next panel.

Abort the Plate?

Ejects the current sample plate or tube holder and leaves the remainder of the Worklist unread allowing resumption from the current sample.

Note: If you select Abort the Plate, in rare instances, the sample probe may move to the wash station and the sample tray exits the instrument.

When this occurs, you need to zzz TWICE so the system performs an initialization which leaves the system ready to acquire.

Repeat the Well?

Allows the current well to be resampled.

Repeat the Panel?

Allows the current panel to be resampled. The MPL returns to the first sample of the current panel.

Restart

If a sample is already being acquired, the Restart button restarts the Acquisition from zero events.

Idle Mode

The Idle Mode button places the Cytometer in Idle mode so that various cleaning and replacing procedures can be performed.

Prime

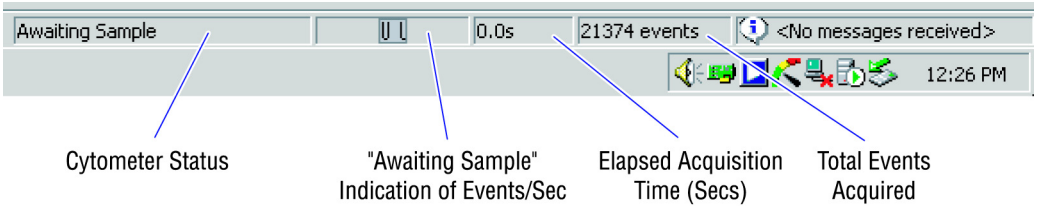
The Prime button allows you to declog or remove bubbles or blockages from the sample line with sheath solution.

Cleanse

The Cleanse button allows you to initiate a cycle to flush the instrument sample lines with cleaning agent. The Cytometer must be in Idle mode, , to perform this function.

Status Bar

The Status Bar which is shown at the bottom of the screen displays the following information when in Acquisition.



See also:
Total Events
Elapsed Time
Data Rate

Total Events

The current total number of events acquired is displayed here.

When acquiring, this value increments to the maximum events set or until one of the Stop conditions has been met. See Acquisition Stop and Save.

When acquiring data in Setup Mode, this item cycles in the range from 0 to 10 times the number of Events shown in the Dots Displayed. The value appears to wraparound, that is, if you have requested 5,000 dots to be displayed, this item increments to 4,999. On the 5,000th event the total events counter resets to 0.

This ensures that you can continue to display data without reaching a set stop condition.

Elapsed Time

This item shows how many seconds have elapsed since the start of data acquisition.

The total elapsed time can be viewed from the FCS Keywords associated with the beginning time and end time of acquisition.

Data Rate

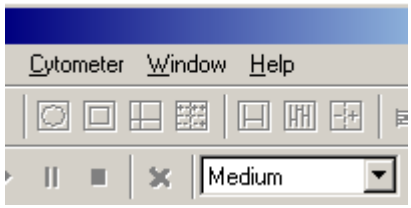
This item shows the speed of data acquisition.

This refers to the Processed Data Rate, that is, the number of events which have exceeded the discriminator, subsequently processed and saved in memory.

Flow Rate

This item shows the relative flow rate of the Cytometer during acquisition. Click on the drop down box and choose the required rate.

The Flow Rate can only be displayed as Low, Medium or High. The Flow Rates are approximately: 10, 30 and 60 µL/min respectively.



Cytometer Status

Displays the current status of the Cytometer and the most recent error message. Double click on this field to display the Cytometer Status Message dialog box.

Windows Status Bar

The Windows Status Bar normally gives a brief description of selected menu items.

When drawing or editing Regions, the Status Bar shows Channel for X and Y parameters respectively as they are drawn.

X and Y Coordinates

The X and Y channel values are the coordinates of the cursor position given by a scaling factor. This scaling factor depends upon whether the respective parameters are linear or logarithmic amplification and whether you have calibrated the parameters or not.

If the parameters are linear and uncalibrated, the X and Y channels vary between 0 - 255 or 0 - 1024 depending on the data source.

If the parameters are logarithmic and uncalibrated, the values vary between 0.1024 - 1024, and span four decades. For most other manufacturers, the data varies between 1 - 10,000, spanning four decades.

B.23 21 CFR 11 MENU

The 21 CFR 11 drop down menu only appears if you have the 21 CFR Part 11 option installed on your system. The functions on this menu help you to be in compliance with the 21 CFR Part 11 Regulation.

Lock Software

Use  **Lock Software** to manually lock the MXP software until you log back into the system. This grays out all functions in the software except Log In. Use **File ▸▸ Log In** to re-enter the MXP software. Only the current user or the System Administrator can log into the MXP software when it has be manually locked.

You need to lock the software whenever the instrument will be out of your control and you do not want to log out of the software.

These automated activities continue without interruption even when the software is locked:

- Acquisition
- Listmode playback
- Batch AutoMATOR
- AutoSetup.

Change Password

Use the **Change Password** feature to change the Password for your User ID.

Note: After you change your password, the System Administrator cannot view it.

The change password feature is not available during any of these automated activities: Acquisition, Listmode playback, Batch AutoMATOR and AutoSetup.

Procedure

To change your password:

---

1 **21 CFR 11 ▸▸ Change Password**.

---

2 Enter your current password in the **Enter Old Password** field.

Note: If you reach the limit of password attempts allowed, you are not able to log into the MXP software. You must ask the System Administrator to unlock you and/or reset your password before you can log into MXP software



---

3 Enter your new password in the **Enter New Password** field.

Note: Passwords must be a minimum of 6 characters and a maximum of 24 characters. Blanks are not allowed. For best security create a password with at least eight characters, including letters, numbers (0-9) and/or symbols.

---

4 Re-enter your new password in the **Re-enter New Password** field.

---

5 OK.

Sign File Version

Use this feature to electronically sign an individual version of a listmode, histogram, protocol, panel, or PDF file.

- One or more persons can sign each version of each file.
- Each person can sign for the same reason or for a different reason.
- You can view the signature information for any version of a file by clicking on the **Signed** field in the Sign Versions dialog box or the appropriate Open File dialog box.

This feature is not available during any of these automated activities: Acquisition, Listmode playback, Batch AutoMATOR and AutoSetup.

Procedure

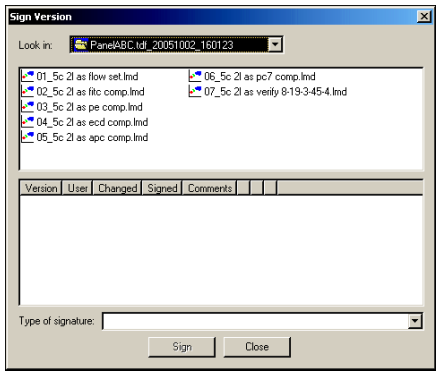
To sign a version of a listmode, histogram, protocol, panel, or PDF file:

---

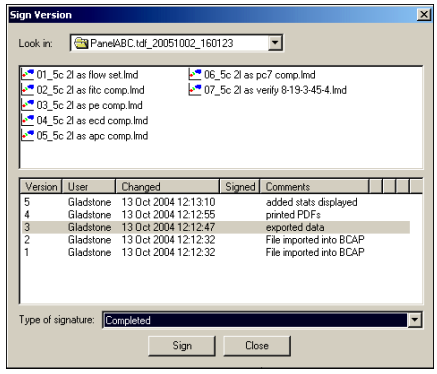
1 **21 CFR 11 ▸▸ Sign File Version**.

---

2 The Sign Version dialog box appears. Navigate to the directory needed.



3 Select the file to be signed.
All of that file's versions appear.



4 Select the version to be signed.

5 Select a **Type of signature** from the pull down menu.

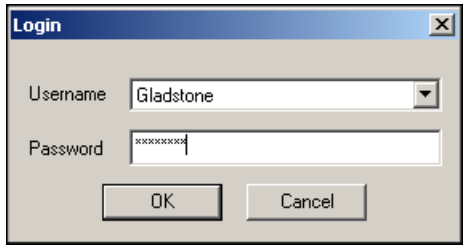
Note: The use and significance of these codes is to be established by your laboratory. The choices are: **Completed**, **Verified**, **Validated**, **Authorized**, **Approved**, and **Certified**.

6 **Sign**.

7 When the Login dialog box appears, enter your User ID and your password.

OK.

Note: If you reach the limit of password attempts allowed, you are not able to log into the MXP software. You must ask the System Administrator to unlock you and/or reset your password before you can log into MXP software.

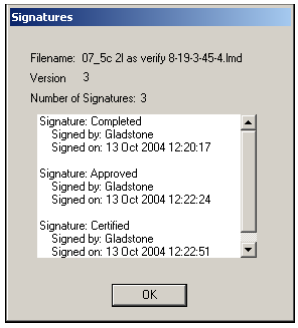


8 If **Yes Click Here** appears in the **Signed** field of a version, you can:

Yes Click Here to view the signature information for that version.

OK after you review the signatures.





9 Repeat the procedure for each version to be signed.

10 **Close** when you are done.

B.24 WINDOW MENU

Cascade

Use **Cascade** to display the window so that the plots overlay.

Window ▸▸ Cascade.

Tile

Arranges each plot so every window display is visible. The pattern depends on the number of open Windows.

Window ▸▸ Tile.

Tile Special

Tile Special overrides the normal Windows **Tile** command, this allows plots within the workspace to be arranged in a logical manor.

Plots are sized equally according to the default size setting in **File ▸▸ Workspace Preferences ▸▸ Plot Display**.

The plot size in Tile Special resizes the plots currently displayed on the workspace.

New Plots may be ordered by File, Gate, or Parameter or any combination of these.

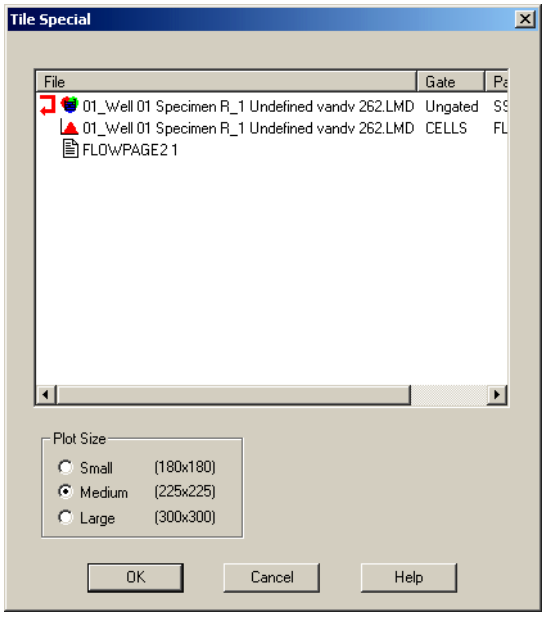
At the start of each row, the Plot Type Icon is displayed.

---

1 **Window ▸▸ Tile Special** to display the **Tile Special** dialog box.

---

2 By clicking the mouse on the **File**, **Gate** or **Parameter** column heading, the plots are displayed across the screen in alphabetical order. Clicking the appropriate column heading again displays the plots in reverse order.



---

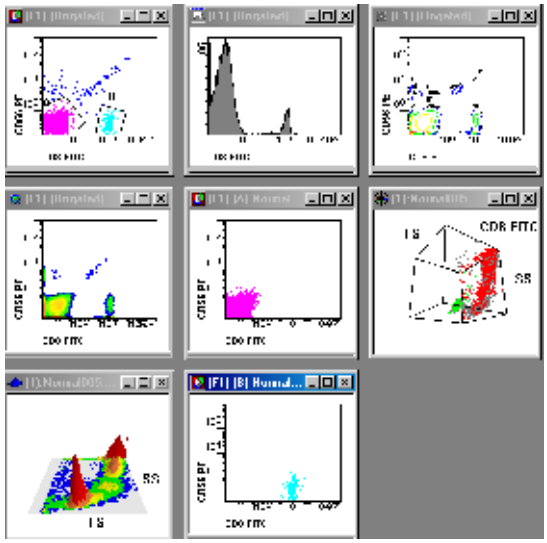
3 The order is shown in the **Tile Special** dialog box. OK to apply the change.

You can also Drag and Drop the plots into any order.

The icon is activated by clicking to the left side of a plot listed in the File column. This forces that plot to be displayed on the following row. If an existing is clicked, the icon marker is removed and New Row is not forced.

In addition, if Ctrl is depressed while the **File**, **Gate** or **Parameters** selection is made, plots can be sorted by Gates within File, and Parameters within Gates/Files.

When OK is selected in the example **Tile Special** screen shown above, the resulting plot display is shown to the right.



Arrange Icons

This option is used to arrange minimized plot windows. Plot windows can be minimized and placed anywhere on screen. **Window ▸▸ Arrange Icons** to place all icons along the bottom of the screen.

Note: This option is very useful when minimized plots have been "lost" on the desktop. Choosing **Window ▸▸ Arrange Icons** places all the icons along the bottom of the MXP software Window.

Force Square

Each window is squared so that horizontal and vertical sides are the same length. That is, aspect ration is forced to 1:1. This is used mainly for dual parameter plots.

Close All

Choosing this option closes all MXP software windows.

C.1 OVERVIEW

The FDA's Electronic Records and Electronic Signatures Rule (21 CFR Part 11) outlines the requirements for submitting documentation in electronic form and the criteria for approved electronic signatures. It defines the standards by which an organization can use electronic records to meet its record-keeping requirements.

Implementation and compliance of the 21 CFR Part 11 regulation is the responsibility of the laboratory creating and signing the electronic records. Proper laboratory procedures and key features of the MXP software, with the 21 CFR Part 11 option installed, as described in this section can be used to achieve compliance with this regulation.

The FC 500 MPL with MXP software is a closed system per the definition stated in Section 11.3, Subpart A of the regulation: Closed System - environment in which system access is controlled by persons responsible for the content of electronic records on the system.

All FC 500 MPL users in your laboratory must be trained to properly and consistently use your laboratory's procedures regarding electronic records and signatures. User training can be documented in the MXP software by the System Administrator.

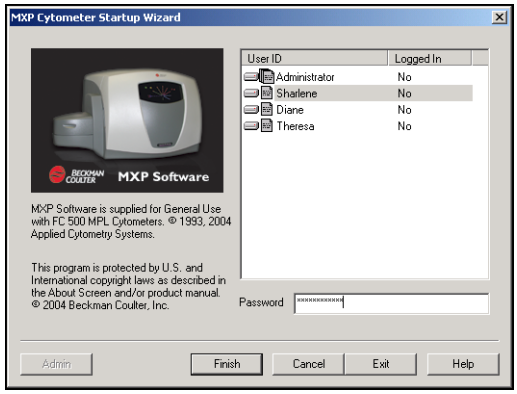
Note: If you have the 21 CFR Part 11 option, do not use RXP or CXP Analysis only software on your Workstation. RXP and CXP Analysis only software are not 21 CFR Part 11 compliant. Any analysis done in those applications will not be tracked in the 21 CFR Part 11 option for MXP software.

C.2 INTEGRITY OF ELECTRONIC DATA

The division of Beckman Coulter that produces the FC 500 MPL and MXP software uses quality controlled, validated development and manufacturing processes. Beckman Coulter, Inc. is certified as ISO:9001:1994 and ISO 13485 compliant.

Passwords

All user accounts are password protected. Follow your laboratory procedures for creating and maintaining passwords.



Be sure to include the following criteria in your laboratory procedures concerning passwords and User IDs:

- Administrator password. It is vital that the Administrator Password is changed from the default password as soon as possible. See the System Administrator Guide for additional details.

  Note: Be sure to maintain the Administrator password in a secure location. If you lose or forget your Administrator password, call your Beckman Coulter Representative.
- Unique User ID/password combination. The System Administrator sets up each User ID and assigns an initial password. The MXP software makes the User create a new password before logging in whenever the System Administrator assigns a password. Once the User creates a new Password, it cannot be viewed by the System Administrator.
- The System Administrator sets the time interval when the User Password expires and must be changed.
- The System Administrator sets the time period of user inactivity that causes the User to be automatically logged out of the MXP software.
- The System Administrator sets the number of unsuccessful password attempts that locks a user out of the system. Only the System Administrator can unlock the user and if needed, reset the password.
- The System Administrator can view and print Audit Trails that include login activities, password changes, and failed password attempts for each current and deleted user.
- There is to be no unauthorized use of another user's ID or password.

Automatic and Manual Lock Out

MXP software provides automatic and manual lock out procedures to control access to the system. Only a logged in user or the System Administrator should have access to the MXP software.

- Automatic Lock Out. The System Administrator defines the time limit of user inactivity (no keyboard or mouse action) that causes the User to be automatically logged out of the MXP software. Once logged out, the user must log in at the Startup Wizard screen to access the MXP software. If automated activities are in progress when automatic log out would normally occur: 1) these activities continue without interruption, 2) the MXP software is not exited but all toolbars and menus are disabled except the **File** ▸▸ Log In menu item and the Cytometer Abort Acquisition button  , and 3) only the user or the System Administrator can use the **File** ▸▸ Log In feature to return to the MXP software.

  These are the automated activities:

  - Acquisition
  - Listmode playback
  - Batch AutoMATOR
  - AutoSetup.
- Manual Lock Out. The user can manually lock the MXP software (all of the features are unavailable) with the Lock Software feature of the 21 CFR 11 drop down menu. The user should lock the software whenever the software will be out of the user's control. The user or System Administrator must use the **File** ▸▸ Log In feature to return to the MXP software.

MXP Software Files

MXP software ensures listmode (LMD), histogram, protocol, panel, and PDF file integrity. Whenever one of these file types is created by MXP software or checked into MXP software, it is assigned a version number. Each time a change is made to one of these file types, an incremental version number is assigned when the file is saved; a comment is required to be saved with each version to describe the action done to the file.

During automated activities, automatic system generated comments are saved to the files, otherwise the user must enter a comment when saving a new version of a file.

Uncontrolled Files that exist in Windows are not under the control of the 21 CFR Part 11 option and cannot be used by the MXP software until they are checked into the MXP software's BCA&P database. A file can be checked into the BCA&P database by simply opening the file within the MXP software. Once an uncontrolled file is checked in, the file receives a version number and becomes a controlled file. See Controlled Files in the Using MXP Software chapter for additional details.

The LMD file is an unchangeable record. Each time you open an LMD file embedded with the runtime protocol for reanalysis, it displays the original analysis regions and results as when collected, along with the User ID and date and time stamp. If you edit and display new results for an LMD file on the screen, and then you save these changes, an incremental version number of the file is saved with the changes made. The LMD file that was initially acquired retains its own version number and is not changed.

Whenever a FlowPAGE or Workspace print is saved as a PDF file for a subsequent analysis, the PDF file is saved with an incremental version number as well.

See also:
Save Listmode File As Procedure - With 21 CFR Part 11 Option Installed
Save Histogram File As Procedure - With the 21 CFR Part 11 Option Installed
Save Protocol Feature - With the 21 CFR Part 11 Option Installed
Save Protocol As Procedure - With the 21 CFR Part 11 Option Installed
21 CFR Part 11 Option - Uncontrolled and Controlled Files

Windows Operating System

The System Administrator should use the security and access features provided by Windows Operating System.

Note: To avoid unnecessary DaCS errors when launching the MXP software and to allow access to all file/folders necessary for 21 CFR Part 11 read/write functionality, set up Windows User accounts with full Administrator rights on a FC 500 MPL flow cytometer that has a Workstation with MXP 21 CFR Part 11 software installed.

Third Party Software Applications

If you use any third party software application, such as Adobe® Acrobat®, you need to have procedures that ensure the security of these electronic records and provide an audit trail. Security software applications may be purchased to provide security when using third party software applications.

C.3 ARCHIVING AND RESTORING ARCHIVED DATA

The System Administrator has the ability to archive data. Archived data can also be restored for additional analysis by the System Administrator.

Whenever a user tries to open an archived data file that has not been restored, the user is notified by the software of the archive directory path and directed to request the System Administrator to restore the archived file needed.

A restored file is restored into the MXP software as a new record for 21 CFR Part 11 purposes. Its version number becomes number one once it is opened for use.

C.4 AUDIT TRAILS

Only the System Administrator can view and print the Audit Trails in the MXP software. Audit Trails can display Login/Logout, file handling, automated, and administrative activities for specified dates and users. See the System Administrator's Guide for additional details.

Audit Trails are also provided by the DaCS software for MS Excel files. See Audit Trails - DaCS Software.

Note: If you use any third party software application, such as Adobe Acrobat, you need to have procedures that ensure the security of these electronic records and provide an audit trail. Security software applications may be purchased to provide security when using third party software applications.

C.5 ELECTRONIC SIGNATURES

MXP software provides the capability to electronically sign individual versions of a listmode, histogram, protocol, panel, or PDF file. See Sign File Version.

Excel worksheets can be signed electronically with the DaCS software provided with the MXP software. Follow your laboratory procedures for signature approval for compliance. See Electronic Signatures - DaCS Software.

Note: If you use any third party software application, such as Adobe Acrobat, you need to have procedures that ensure the security of these electronic records and provide an audit trail. Security software applications may be purchased to provide security when using third party software applications.

C.6 DaCS SOFTWARE

DaCS software is provided with the 21 CFR Part 11 option of the MXP software. By providing Audit Trails and electronic signatures for worksheets, DaCS software provides the controls to help you bring your laboratory into 21 CFR Part 11 compliance for data files exported to Microsoft Excel from the MXP software.

When you log into MXP software:

- A DaCS progress bar screen briefly appears as the DaCS software is started.
- No additional actions are needed after you log into the MXP software to be automatically logged into the DaCS software when data is exported to MS Excel.

When you log out of MXP software:

- All open Excel workbooks are saved and closed,
- You are automatically logged out of the DaCS software.

The MXP DaCS Interface Workbook is opened when data is exported to MS Excel from the MXP software. A _SYSTEM and an _AUDIT worksheet and tab always appear in a DaCS software controlled workbook. 

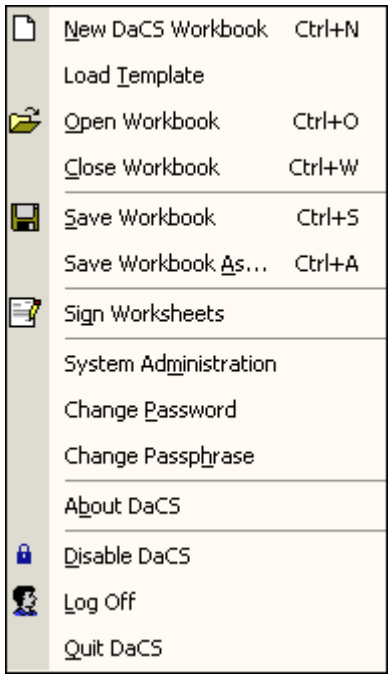
Your results appear in the Result # worksheet(s) of the workbook.

User's Manual

Refer to the DaCS User's manual, which can be accessed from the Support Tab in the Resource Explorer, for detailed information how this application interfaces with MS Excel.

This additional **DaCS** drop down menu appears in MS Excel. Some of the other Excel drop down menus are also modified when Excel is opened in the MXP/DaCS software environment.

For use of the DaCS features, such as electronic signatures, separately set up a User in the DaCS software for each MXP User ID.



Audit Trails - DaCS Software

When working in MS Excel files with DaCS software, an Audit Trail is provided as a separate worksheet (_AUDIT) within the workbook. See the DaCS User's manual for details of what information is audited.

These MXP software related activities are also audited. The cell based auditing functions are disabled while these activities are in process.

- Workbook creation
- Workbook naming
- Statistics data insertion
- Workbook saving
- Workbook closing.

Electronic Signatures - DaCS Software

See the DaCS User's manual for details of the electronic signature feature for workbooks.

Setting Up User IDs

MXP Software User IDs

- The MXP software System Administrator sets up the User IDs and passwords for MXP software.
- When you are logged into the MXP software and data is exported to MS Excel, you are automatically logged into the DaCS software.
- Your MXP User ID appears at the top of the Excel screen.



DaCS Users For Use Outside MXP Software

The System Administrator must set up Users in the DaCS software so the Users can have access to additional functionality, such as electronic signatures, during analysis of Excel data files when MXP software is not open.

21 CFR Part 11 - The FDA's Electronic Records and Electronic Signatures Rule that outlines the requirements for submitting documentation in electronic form and the criteria for approved electronic signatures is also known as 21 CFR Part 11. It defines the standards by which an organization can use electronic records to meet its record-keeping requirements. The MXP software has a 21 CFR Part 11 option that enables your laboratory to comply with this regulation.

Accuracy - The ability of an instrument to agree with a predetermined reference value at any point within the operating range. Contrast with precision.

APC - Abbreviation for allophycocyanin dye.

ASCII - Abbreviation for American Standard Code for Information Interchange. An ASCII file is a type of text file.

Assay values - Values for a control established by extensive repeat testing of that control.

AutoGate - A gate that automatically sizes to the population contained within the boundaries of the region. There are two types: Elliptical and Contour.

AutoSetup Wizard - A software feature that guides you through the processing of quality control materials to automatically establish your application settings.

AUX Signal - Auxiliary acquisition pathway that allows either control of simultaneous Lin and Log signals or acquisition of a Peak signal.

Background count - Measure of the amount of electrical or particle interference.

BCA&P database - This is the Beckman Coulter Accounts & Permissions database in the MXP software.

BP filter - A band-pass optical filter that passes a band of wavelengths and blocks others.

Button - The Workstation screens have pictures/icons (for example, ) that you select with the mouse to tell the software what to do. They are arranged on Toolbars for related functions.

Cal Factor - A number used in conjunction with a known number of particles identified by a CAL region, that adjusts the region counts obtained.

Channel - In an analog-to-digital converter, the number of equally spaced divisions of the amplified input signal voltage. All FC 500 MPL flow cytometer signals are resolved into 1024 channels. For dual-parameter histograms, the number of channels is reduced to 64, 128, or 256.

Cleaning agent - A detergent used to flush sample from tubing and minimize protein buildup.

Click - To press and release a mouse button.

Coefficient of variation (CV%) - A measure of the variability in signal intensity that is generated as particles pass repeatedly through the laser beam. This variability is expressed as a percentage of the average signal intensity.

Collimate - To make parallel (for example, collimate rays of light).

Color compensation - The subtraction of:

- a percentage of the signal from one fluorescence light sensor from
- the signal from another fluorescence light sensor

to correct for the overlap of one dye's emission into another dye's emission measurement.

Control - A substance used to routinely monitor the performance of an analytical process that does not have the characteristic being measured (for example, Immuno-Trol cells or CYTO-TROL control cells).

Controls and indicators - Instrument controls are the mechanisms you use to communicate with the instrument. Indicators are the mechanisms the instrument uses to communicate with you.

Cross-cylindrical lenses - Used in the Cytometer to focus the laser beam and form an elliptical beam spot.

Cytometer - The system component that analyzes the sample and contains the sheath fluid and cleaning agent bottles.

Cytosettings - Cytometer hardware settings. Consists of acquisition duration, acquisition maximum events, gating settings, disciminators, voltages, gains, baseline offset and compensation settings. Same as Instrument Settings in Acquisition Manager.

db - Abbreviation for decibels.

dc - Abbreviation for direct current.

Defaults - Original settings for the instrument. You can change them to customize the settings for your laboratory.

DiOC5(3) - Abbreviation for oxacarbocyanine dye.

Discriminator - A channel setting for a parameter that lets you ignore events below the setting. This lets you eliminate signals caused by debris.

DL filter - A dichroic, long-pass optical filter that directs light in different spectral regions to different detectors.

Event - A particle passing through the laser beam.

Export file (*.XLS or *.TXT) - File containing selectable statistics and other sample information from each sample run.

FDA - Abbreviation for fluorescein diacetate dye.

FITC - Abbreviation for fluorescein isothiocyanate dye.

Flow cell - A device through which particles pass, in a stream of fluid, one at a time, through a laser beam.

Flow cytometry - A process for measuring the characteristics of cells or other biological particles as they pass through a measuring apparatus in a fluid stream.

Flow Cytometry Standard (FCS) - The flow cytometry data file standard that provides the specifications needed to completely describe flow cytometry data sets within the confines of the file containing the data.

FlowPAGE - A template for creating a report. It can include: data plots, statistics, and user attached text and/or graphics.

Fluorescent light - The emission of electromagnetic radiation that occurs when the emitting body absorbs radiation from some other source. For example, when a fluorescent dye is excited (absorbs radiation), it emits fluorescent light at a wavelength that is different from the wavelength of the light that excited it.

Fluorescent light (FL1, FL2, FL3, FL4 and FL5) sensors (PMTs) - Collect the fluorescent light and generate voltage pulse signals. The 1 refers to the first fluorescence sensor; 2 the second; and so forth.

Forward scatter (FS) - The laser light scattered at narrow angles to the axis of the laser beam. The amount of forward scatter is proportional to the size of the cell that scattered the laser light.

Forward scatter (FS) sensor - Collects the forward scatter and generates voltage pulse signals.

Gain - The amount of amplification applied to a signal. In linear amplification, all of a sensor's signals are increased by the same amount. Contrast with logarithmic amplification.

Gating - The use of criteria that must be met before an event is included in a histogram.

GB - The abbreviation for gigabyte.

High voltage - Can be adjusted to change the sensitivity of a fluorescent light sensor.

Histogram - A graph showing the relative number and distribution of events.

HPCV - Half peak coefficient of variation is primarily indicated for bead alignment purposes which is performed using linear scaled data.

Hydrodynamic focusing - A process that focuses the sample stream through the flow cell. It ensures that cells move through the laser beam one at a time, along the same path.

Indicators - See Controls and Indicators.

Integral signal - A voltage pulse with height and area proportional to the total amount of fluorescent material in a cell.

IQAP - Abbreviation for Beckman Coulter's Interlaboratory Quality Assurance Program. A service for all worldwide users of Immuno-Trol cells and CYTO-TROL control cells, the IQAP statistically compares your control data with that of other laboratories.

IVD - Abbreviation for “For In Vitro Diagnostic Use”.

Laser - Abbreviation for light amplification by stimulated emission of radiation. The standard laser is in the flow cell for analyzing cells.

Linear amplification - See gain.

Listmode data - A list of measurements from each cell.

Listmode playback tool - A tool used: 1) to replay 20-bit linear listmode data though new compensation settings, 2) for panel playback of listmode files, and 3) to replay AutoSetup listmode files to generate a new compensation file.

LiveGate - Listmode Gate used as a live gate in acquisition and for listmode archival.

LMD - Abbreviation for listmode.

Lock out - If you have the 21 CFR Part 11 option, you can be manually or automatically locked out of the MXP software. You can manually lock the software whenever the instrument will be out of your control but you do not want to log out of the software. An automatic lock out occurs when no mouse or keyboard activity has occurred for the time limit set by the System Administrator. When the workstation is locked, automated activities (acquisition, listmode playback, batch AutoMATOR, AutoSetup) continue without interruption.

Logarithmic amplification - A method of increasing the gain and dynamic range of a signal. A larger gain is applied to a sensor's smaller signals than to the sensor's larger signals. See also gain.

MB - Abbreviation for megabyte.

Mean - Arithmetic average of a group of data. See also standard deviation and coefficient of variation.

Menu - On a Workstation screen, a list of items from which you can choose.

Minimum Event Counter - The count that must minimally be achieved in order to stop acquisition. Used to ensure collection of rare events.

Mouse - A pointing device. The cursor on the Workstation screen moves as you slide the mouse on your desk or other flat surface.

Multi-Plate Loader (MPL) - An automated sample loader for the instrument.

Neutral density (ND1) filter - An optical filter that can be used with the forward scatter sensor to reduce the intensity of the forward scatter, thus enabling the instrument to analyze large particles without saturating the sensor.

Optical filters - Mediums, such as glass, that separate fluorescent light by wavelength, which is measured in nanometers (nm). See also BK, BP, and DL filters.

Panel - In general, a group of protocols for analyzing a series of samples corresponding to one specimen. The Cytometer settings and regions can be passed on through the panel with identification of the primary samples.

Panel Wizard - A software feature that guides you through creating or editing a panel.

PC7 - Abbreviation for phycoerythrin-cyanine 7 tandem dye.

pg (picogram) - A unit of mass equal to 10^{-12} gram.

Photo-multiplier tube (PMT) - A light-sensitive sensor that converts light energy into electrical current and generates a voltage pulse signal.

Pickup lens/spatial filter assembly - Collects side scatter and fluorescent light from only the sensing area of the flow cell, and collimates it.

Plate Definition File - A *.tdf file is created when you define and save sample plate information in the Plate Wizard. The file contains the plate type and all the well assignments.

Plate Wizard - A software screen that guides you through creating or editing a *.tdf file for sample plate assignments and worklist creation.

Pop-up window - A rectangular area that appears on top of the current screen displayed on the Workstation. You must close the window before you can use the current screen again.

Positives analysis - Analysis performed on the negative control to set regions automatically to exclude the negative population from the positives statistics.

Power Supply - The system component that provides direct current power, pressure, and vacuum to the Cytometer.

Precision - Ability of an instrument to reproduce similar results when a sample is run repeatedly. Precision shows the closeness of test results when repeated analyses of the same material are performed. Also known as reproducibility. Contrast with accuracy.

PRIME region - When a histogram Peak is not within a PRIME Region the system performs an AutoPrime.

Printer - An optional system component that provides a printout of sample results and other information.

Prism - Phenotype plot for multicolor analysis.

Prism histogram - Histogram that displays the phenotype of an identified population.

Protocol - A set of instructions that tells the Cytometer what and how to acquire data and relay listmode data.

Quality control (QC) - A comprehensive set of procedures a laboratory sets up to ensure that an instrument is working accurately and precisely.

QuickCOMP - Direct histogram manipulation to adjust Cytometer color compensation.

QuickSET - Direct histogram manipulation to adjust Cytometer voltages and gain.

RD1 - Abbreviation for phycoerythrin dye.

Romlock - A software licensing mechanism that is attached to the computer that enables access to the MXP software.

Runtime Protocol - The Protocol stored with the listmode file at acquisition. Listmode replays identical to the acquisition protocol.

Sample ID - ID assignments made to a well or tube on the Plate Wizard to identify acquisition information. Up to four Sample IDs can be defined per well or tube.

Scroll bar - The area on the left of a pop-up window. The bar's arrows let you move (scroll) the window's content up or down so that you can see other parts of it. For example, the scroll bar in the Resource Explorer lets you scroll through the entire list of protocol names.

Select - To position the mouse cursor on an item, and then press and release a mouse button to choose that item.

Sensitivity - The ability of the instrument to distinguish very low levels of light scatter and fluorescence from background light or electronic noise.

Sheath fluid - A balanced electrolyte solution.

Side scatter - The amount of laser light scattered at about a 90° angle to the axis of the laser beam. The amount of side scatter is proportional to the granularity of the cell that scattered the laser light.

Side scatter (SS) sensor - Collects the side scatter and generates voltage pulse signals.

Slider bars - They appear on dual fluorescence plots when you enable QuickCOMP mode on the Cytometer Control dialog box. These sliders are used to intuitively adjust the compensation coefficients and update the compensation values in the Cytometer Control Compensation Tab.

SQL - Standard query language.

Standard deviation (SD) - A measure of difference from the mean. A measure of precision.

Toolbar - A series of software buttons with related functions.

USPTO - United States Patent and Trademark Office

Version number - If you have the 21 CFR Part 11 option: listmode, histogram, protocol, panel and PDF files receive version numbers. The version number is an automatically assigned number, incremented by one, that the system places at the end of a file as part of the save process.

Voltage pulse signals - The signals that the forward scatter, side scatter, and fluorescence sensors generate. They are proportional to the intensity of light the sensor received.

Well Location - The letter and number combination that identifies the well in the plate by row (letter) and column (number) position.

Well Number - The number that appears inside the well in the picture of the sample plate on the Plate Wizard.

Workstation - The system component that runs the software that lets you control the instrument. It displays sample results and other information.

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